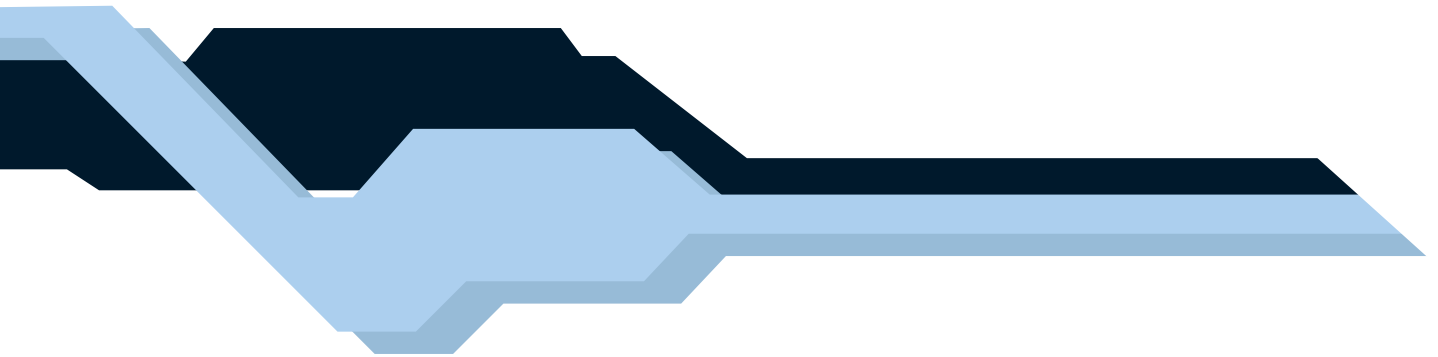


Operation Manual



CUBASE AI₄

Integrated Music Production System



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Welcome!

This is the Operation Manual for Steinberg's Cubase AI 4. Here you will find detailed information about all the features and functions in the program.

About the program versions

The documentation covers two different operating systems or "platforms"; Windows and Mac OS X.

Some features and settings described in the documentation are specific to one of the platforms, Windows or Mac OS X. This is clearly stated in the applicable cases. In other words:

⇒ If nothing else is said, all descriptions and procedures in the documentation are valid under Windows and Mac OS X.

The screenshots are taken from the Windows version.

Key command conventions

Many of the default key commands in Cubase AI use modifier keys, some of which are different depending on the operating system. For example, the default key command for Undo is [Ctrl]+[Z] under Windows and [Command]+[Z] under Mac OS X.

When key commands with modifier keys are described in this manual, they are shown with the Windows modifier key first, in the following way:

[Win modifier key]/[Mac modifier key]+[key]

For example, [Ctrl]/[Command]+[Z] means "press [Ctrl] under Windows or [Command] under Mac OS X, then press [Z]".

Similarly, [Alt]/[Option]+[X] means "press [Alt] under Windows or [Option] under Mac OS X, then press [X]".

⇒ Please note that this manual often refers to right-clicking, e.g. to open context menus, etc. If you are using a Mac with a single-button mouse, hold down [Ctrl] and click.

**VST Connections: Setting up input and
output busses**

About this chapter

Cubase AI uses a system of input and output busses to transfer audio between the program and the audio hardware.

- Input busses let you route audio from the inputs on your audio hardware into the program. This means that when you record audio, you will always do this through one or several input busses.
- Output busses let you route audio from the program to the outputs on your audio hardware. When you play back audio, you will always do this through one or several output busses.

As you can see, the input and output busses are vital when you work with Cubase AI. This is why you find this chapter at the beginning of the Operation Manual – once you understand the bus system and set up the busses properly, it will be easy to go on with recording, playing back and mixing.

Setting up busses

Strategies

In Cubase AI, you can create up to 8 stereo busses or up to 16 mono busses, respectively.

⇒ The bus configuration is saved with the projects – therefore it's a good idea to add and set up the busses you need and save these in a template project (see [“Save as Template”](#) on [page 239](#)).

When you start working on new projects, you start from this template. That way you get your standard bus configuration without having to make new bus settings for each new project. If you need to work with different bus configurations in different projects, you can either create several different templates or store your configurations as presets (see [“Other bus operations”](#) on [page 12](#)). The templates can of course also contain other settings that you regularly use – sample rate, record format, a basic track layout, etc.

Input busses

- Most likely you need at least one stereo input bus assigned to an analog input pair. This will let you record stereo material. If you want to be able to record in stereo from other analog input pairs as well, you could add stereo input busses for these, too.

- Although you can record mono tracks from one side of a stereo input, it may be a good idea to add a dedicated mono input bus. This could be assigned to an analog input to which you have connected a dedicated microphone pre-amp for example. Again, you can have several different mono busses.
- You probably want a dedicated stereo input bus assigned to the digital stereo input, for digital transfers.

Output busses

- You probably want one or several stereo output busses for monitoring and listening to stereo mixes.
- For digital transfers, you need a stereo bus assigned to the digital stereo output as well.

Preparations

Before you set up busses, you should name the inputs and outputs on your audio hardware.

The reason for this is compatibility – it makes it easier to transfer projects between different computers and setups. For example, if you move your project to another studio, the audio hardware may be of a different model. But if both you and the other studio owner have given your inputs and outputs names according to the setup rather than names based on the audio hardware model, Cubase AI will automatically find the correct inputs and outputs for your busses and you will be able to play and record without having to change the settings.

Use the Device Setup dialog to assign names to the inputs and outputs of your audio hardware:

1. Open the Device Setup dialog from the Devices menu.
2. Make sure that the correct driver for your audio hardware is selected on the VST Audio System page, so that the audio card is listed in the Devices list.
3. Select your audio card in the list.
The available input and output ports on your audio hardware are listed on the right.
4. To rename a port, click its name in the “Show as” column and enter a new name.

- If needed, you can also disable ports by deactivating them in the “Visible” column.

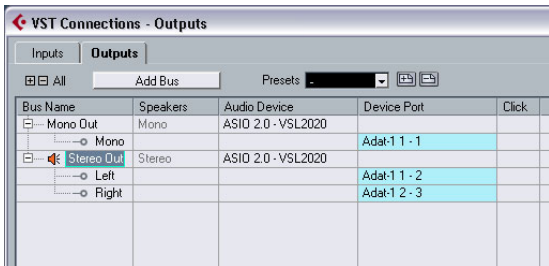
Disabled ports won't show up in the VST Connections window when you are making bus settings. If you attempt to disable a port that is used by a bus, you will be asked whether this is really what you want – note that this will remove the port from the bus!

5. Click OK to close the Device Setup dialog.

⇒ If you open a project created on another computer and the port names don't match (or the port configuration isn't the same – e.g. the project is created on a system with multi-channel i/o and you open it on a stereo in/out system), a Pending Connections dialog will appear. This allows you to manually re-route ports used in the project to ports available in your system.

The VST Connections window

You add and set up busses in the VST Connections window, opened from the Devices menu.



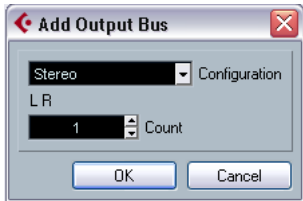
This window contains the Inputs and Output tabs for viewing input busses or output busses, respectively.

Depending on which tab you have selected, the window lists the current input or output busses, with the following columns:

Column	Description
Bus Name	Lists the busses. You can select busses and rename them by clicking on them in this column.
Speakers	Indicates the speaker configuration (mono, stereo) of each bus.
Audio Device	This shows the currently selected ASIO driver.
Device Port	When you have "opened" a bus (by clicking its + button in the Bus Name column) this column shows which physical input/output on your audio hardware is used by the bus.
Click	You can route the click to a specific VST output bus.

Adding a bus

1. Open the Inputs or Outputs tab depending on which you want to add.
2. Click the Add Bus button.
A dialog appears.



3. Select the desired (channel) configuration.
You can add stereo and mono busses.

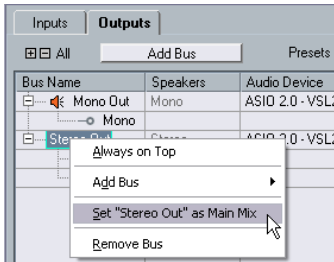
▪ Alternatively you can right-click in the VST Connections window and add a bus in the desired format directly from the context menu that appears.
The new bus appears with the ports visible.

4. Click in the Device Port column to select an input/output port for a channel in the bus.
The pop-up menu that appears lists the ports with the names you have assigned in the Device Setup dialog. Repeat this for all channels in the bus.

Setting the Main Mix bus (the default output bus)

The Main Mix is the output bus that each new channel in the mixer will be assigned to when it is created.

Any one of the output busses in the VST Connections window can be the default output bus. By right-clicking on the name of an output bus, you can set this bus as the Main Mix bus.



Setting the default output bus in the VST Connections window.

When creating new audio, group or FX channels in the mixer, they will automatically be routed to the default bus.

⚠ The default bus is indicated by an orange speaker icon next to its name in the VST Connections window.

Other bus operations

- To change the port assignment for a bus, you proceed as when you added it – make sure the channels are visible (by clicking the “+” button next to the bus, or by clicking the “+ All” button at the top of the window) and click in the Device Port column to select ports.

- To remove a bus you don’t need, select it in the list, right-click and select “Remove Bus” from the pop-up menu, or press [Backspace].

- You can store and recall bus presets with the pop-up menu at the top of the window.
To store the current configuration as a preset, click the Store “+” button and enter a name for the preset. You can then select the stored configuration directly from the Presets pop-up menu at any time. To remove a stored preset, select it and click the “-” button.

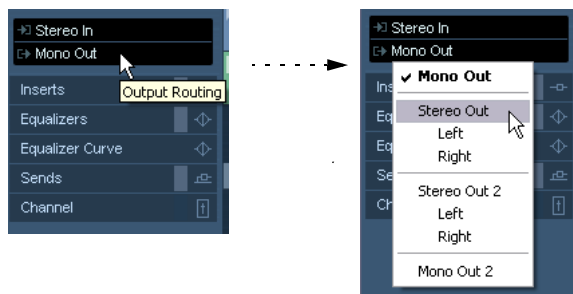
Using the busses

This section describes briefly how to use the input and output busses you have created. For details refer to the chapters “Recording” on page 44 and “The mixer” on page 75.

Routing

When you play back an audio track (or any other audio based channel in the mixer), you route it to an output bus. In the same way, when you record on an audio track you select from which input bus the audio should be sent.

- You can select input and output busses in the Inspector, using the Input and Output Routing pop-up menus.



For audio-related channel types other than audio track channels (i.e. VST Instrument channels, Group channels and FX channels), only the Output Routing pop-up menu is available. Select one of its subtracks in the Track list to open it.

When selecting an input bus for a track you can only select busses that correspond to the track’s channel configuration. Here are the details for input busses:

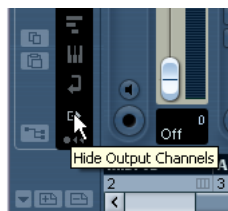
- Mono tracks can be routed to mono input busses or individual channels within a stereo input bus.
- Stereo tracks can be routed to stereo or mono input busses.

For output busses any assignment is possible.

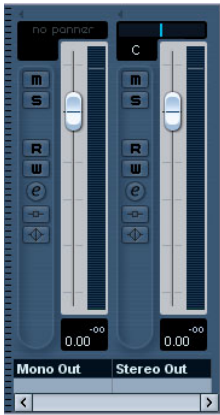
Viewing the busses in the mixer

⇒ Note that only the output busses are available in the mixer – not the input busses.

The available output busses are represented as output channel strips in the mixer (shown in a separate pane to the right). You can show or hide output channels by clicking the corresponding button in the mixer common panel:



The output channel strips



The output channels are shown to the right in the mixer. Here you can do the following:

- Adjust the output level for the busses with the faders.
- Open the Channel Settings window to add effects or EQ. These will affect the whole bus. Examples of effects you may want to add here include compressors, limiters and dithering. See the chapter "Audio effects" in the separate Plug-in Reference manual.

About monitoring

The Main Mix bus (the default output bus) is used for monitoring (see ["Setting the Main Mix bus \(the default output bus\)"](#) on [page 11](#)).

Setting the monitoring level

You can adjust the monitoring level in the Mixer.

- When auditioning or scrubbing in the Sample Editor, you can also set the monitoring level using the small fader on the Sample editor toolbar.

Background

The Project window is the main window in Cubase AI. This provides you with an overview of the project, allowing you to navigate and perform large scale editing. Each project has one Project window.

About tracks

The Project window is divided vertically into tracks, with a timeline running horizontally from left to right. The following track types are available:

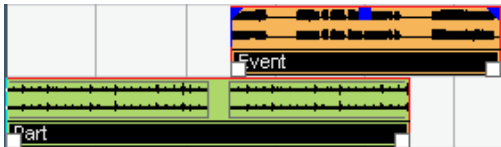
Track type	Description
Audio	For recording and playing back audio events and audio parts. Each audio track has a corresponding audio channel in the mixer. An audio track has an automation track for automating mixer channel parameters, insert effect settings etc.
Folder	Folder tracks function as containers for other tracks, making it easier to organize and manage the track structure. They also allow you to edit several tracks at the same time. See "Folder tracks" on page 66 .
FX Channel	FX channel tracks are used for adding send effects. Each FX channel can contain up to eight effect processors – by routing effect sends from an audio channel to an FX channel, you send audio from the audio channel to the effect(s) on the FX channel. Each FX channel has a corresponding channel strip in the mixer – in essence an effect return channel. See the chapter "Audio Effects" in the separate Plug-in Reference manual. An FX channel also has an automation track for automating mixer channel parameters, effect settings etc. All FX channel tracks are automatically placed in a special FX channel folder in the Track list, for easy management.
Group Channel	By routing several audio channels to a Group channel, you can submix them, apply the same effects to them, etc. (see "Using group channels" on page 86). A Group channel track contains no events as such, but displays settings and automation curves for the corresponding Group channel. Each Group channel track has a corresponding channel strip in the mixer. In the Project window, Group channels are organized as subtracks in a special Group Tracks folder.
Instrument	This allows you to create a track for a dedicated instrument, making e.g. VST instrument handling easier and more intuitive. Instrument tracks have a corresponding channel strip in the mixer. Each instrument track also has an automation track in the Project window. However, Volume and Pan are automated from within the mixer. For more information on instrument tracks, see "Instrument tracks" on page 140 .
MIDI	For recording and playing back MIDI parts. Each MIDI track has a corresponding MIDI channel strip in the mixer. A MIDI track has an automation track for automating mixer channel parameters, insert and send effect settings etc.

Track type	Description
Marker	The Marker track displays markers which can be moved and renamed directly in the Project window (see "Using the Marker track" on page 72). A project can have only one marker track.
Video	For playing back video events. A project can only have one video track.

About parts and events

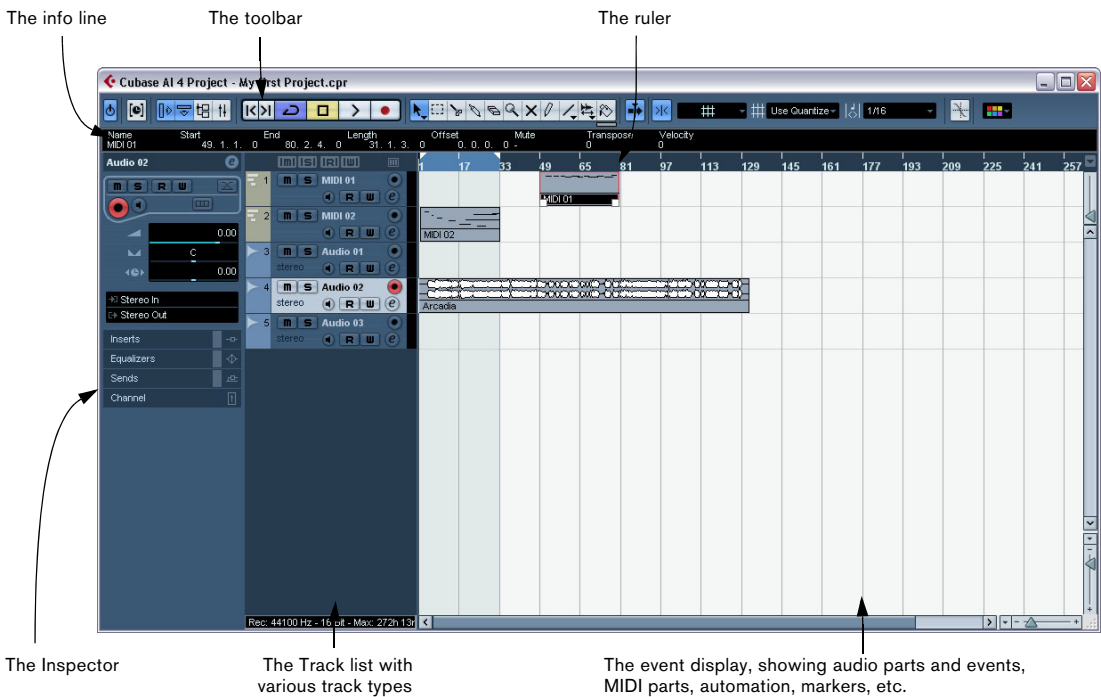
Events are the basic building blocks in Cubase AI. Different event types are handled differently in the Project window:

- Video events and automation events (curve points) are always viewed and rearranged directly in the Project window.
- MIDI events are always gathered in MIDI parts, containers for one or more MIDI events. MIDI parts are rearranged and manipulated in the Project window. To edit the individual MIDI events in a part, you have to open the part in a MIDI editor (see ["About editing MIDI"](#) on [page 166](#)).
- Audio events can be displayed and edited directly in the Project window, but you can also work with audio parts containing several events. This is useful if you have a number of events which you want to treat as one unit in the project.



An audio event and an audio part.

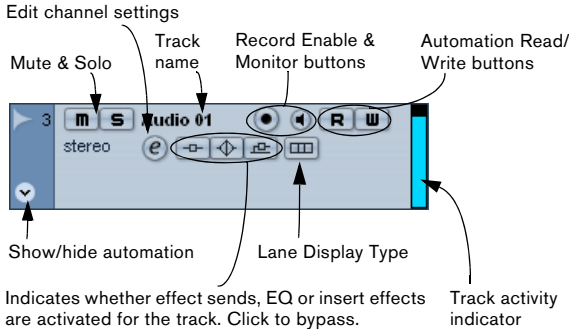
Window Overview



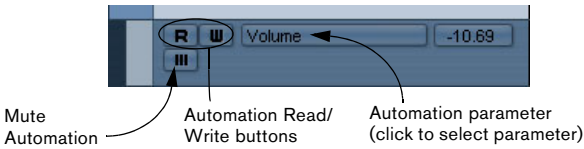
The Track list

The Track list displays all the tracks used in a project. It contains name fields and settings for the tracks. Different track types have different controls in the Track list. To see all the controls you may have to resize the track in the Track list (see ["Resizing tracks in the Track list"](#) on [page 22](#)).

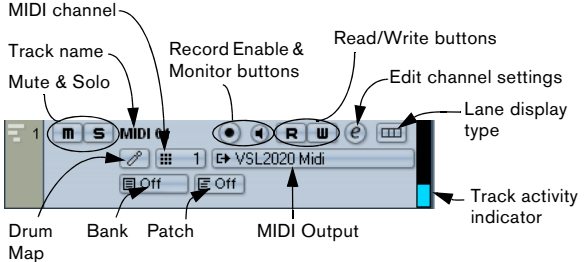
- The Track list area for an audio track:



- The Track list area for an automation track (opened by clicking the Show/Hide Automation button on a track):



- The Track list area for a MIDI track:



The Inspector

The area to the left of the Track list is called the Inspector. This shows additional controls and parameters for the track you have selected in the Track list. If several tracks are selected (see “Handling tracks” on page 25), the Inspector shows the setting for the first (topmost) selected track.

To hide or show the Inspector, click the Inspector icon in the toolbar.



The Inspector icon.

- For most track classes, the Inspector is divided into a number of sections, each containing different controls for the track. You can hide or show sections by clicking on their respective names.

Clicking the name for a hidden section brings it into view and hides the other sections. [Ctrl]/[Command]-clicking the section name allows you to hide or show a section without affecting the other sections. Finally, [Alt]/[Option]-clicking a section name shows or hides all sections in the Inspector.



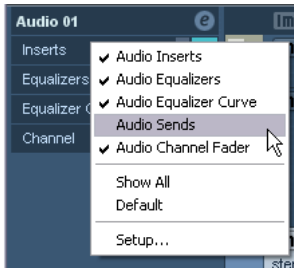
- You can also use key commands to show different Inspector settings. These are set up in the Key Commands dialog, see “Setting up key commands” on page 251.

⇒ Hiding a section does not affect its functionality. In other words, if you have set up a track parameter or activated an effect for example, your settings will still be active even if you hide the respective Inspector section.

Which sections are available in the Inspector depends on the selected track.

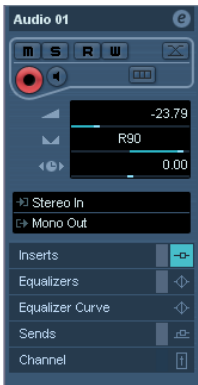
⇒ Please note that not all Inspector tabs are shown by default. You can show/hide Inspector sections by right-clicking on an Inspector tab and activating/deactivating the desired option(s).

Make sure you right-click on an inspector tab and not on the empty area below the Inspector, as this will open the Quick context menu instead.



The Inspector Setup context menu.

Sections



The Inspector contains the controls that can be found on the Track list, plus some additional buttons and parameters. In the table below, these additional settings and the available sections are listed. Which sections are available for which track type is described in the following sections.

Parameter	Description
Edit Channel settings	Opens the Channel Settings window for the track, allowing you to view and adjust effect and EQ settings, etc. See “Using Channel Settings” on page 82.
Auto Fades Settings button	Opens a dialog in which you can make separate Auto Fade settings for the track. See “Making Auto Fade settings for a separate track” on page 65.

Parameter	Description
Volume	Use this to adjust the level for the track. Changing this setting will move the track's fader in the mixer window, and vice versa. See "Setting volume in the mixer" on page 80 to learn more about setting levels.
Pan	Use this to adjust the panning of the track. As with the Volume setting, this corresponds to the Pan setting in the mixer.
Delay	This adjusts the playback timing of the audio track. Positive values delay the playback while negative values cause the track to play earlier. The values are set in milliseconds.
Input Routing	This lets you specify which Input bus or MIDI input the track should use (see "Setting up busses" on page 10 for information about Input busses).
Output Routing	Here you decide to which output the track should be routed. For audio tracks you select an output bus (see "Setting up busses" on page 10) or Group channel, for MIDI tracks you select a MIDI output.
Inserts section	Allows you to add insert effects to the track, see the chapter "Audio effects" in the separate Plug-in Reference manual. The Edit button at the top of the section opens the control panels for the added insert effects.
Equalizers section	Lets you adjust the EQs for the track. You can have up to four bands of EQ for each track, see "Making EQ settings" on page 83 . The Edit button at the top of the section opens the Channel Settings window for the track.
Equalizer Curve section	Lets you adjust the EQs for the track graphically, by clicking and dragging points in a curve display.
Sends section	Allows you to route an audio track to one or several FX channels (up to eight), see the chapter "Audio effects" in the separate Plug-in Reference manual. The Edit button at the top of the section opens the control panel for the first effect in each FX channel.
Channel section	Shows a duplicate of the corresponding mixer channel strip. The channel overview strip to the left lets you activate and deactivate insert effects, EQs and sends.

Audio tracks

For audio tracks, all settings and sections listed above are available.

MIDI tracks

When a MIDI track is selected, the Inspector contains a number of different sections and parameters, affecting the MIDI events in real time (e.g. on playback).

Marker tracks

When the marker track is selected, the Inspector shows the marker list. See ["The Marker window"](#) on [page 71](#).

Video tracks

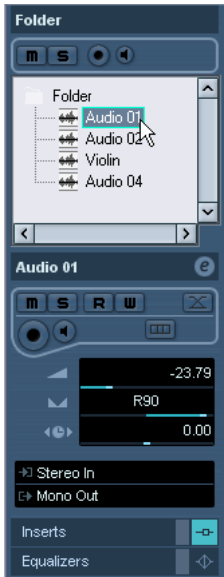
When a video track is selected, the Inspector contains a Mute button for interrupting video playback.

Folder tracks

When a folder track is selected, the Inspector shows the folder and its underlying tracks, much like a folder structure in the Windows Explorer or Mac OS X Finder.

⇒ You can click one of the tracks shown under the folder in the Inspector to have the Inspector show the settings for that track.

This way, you don't have to "open" a folder track to make settings for tracks within it.



Here, an audio track within the folder is selected.

FX channel tracks

When an FX channel track is selected, the following controls and sections are available:

- Edit button.
- Volume control.
- Pan control.
- Output routing pop-up menu.
- Inserts section.
- Equalizers section.
- Equalizer Curve section.
- Channel section.

FX channel folder tracks

FX channel tracks are automatically placed in a special folder, for easier management. When this folder track is selected, the Inspector shows the folder and the FX channels it contains. You can click one of the FX channels shown in the folder to have the Inspector show the settings for that FX channel – this way you don't have to "open" a folder track to access the settings for the FX channels in it.

Group channel tracks

When a Group channel track is selected, the following controls and sections are available:

- Edit button.
- Volume control.
- Pan control.
- Output routing pop-up menu.
- Inserts section.
- Equalizers section.
- Sends section.
- Channel section.

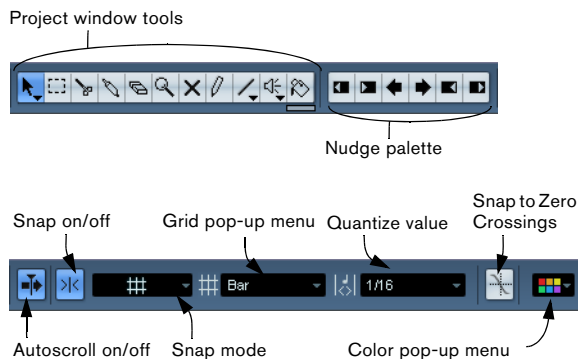
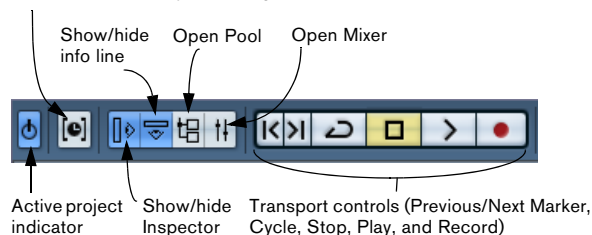
Group channel folder tracks

Just like FX channel tracks, all Group channel tracks are placed in a separate folder – when this is selected, the Inspector shows the folder and the Group channels it contains. You can click one of the Group channels shown in the folder to have the Inspector show the settings for that Group channel – this way, you don't have to "open" a folder track to access the settings for the Group channels in it.

The toolbar

The toolbar contains tools and shortcuts for opening other windows and various project settings and functions:

Constrain delay compensation (see the chapter "VST Instruments" in the separate Plug-in Reference manual).



⇒ How to set up the toolbar and specify which tools should be displayed or hidden is described in the section "The Setup dialogs" on page 245.

The info line

File	Description	Start	End
AnaBaSS A2_0	AnaBaSS A2_0	21. 1. 1. 0	25. 1. 1. 0

The info line shows information about the currently selected event or part in the Project window. You can edit almost all values on the info line using regular value editing. Length and position values are displayed in the format currently selected for the ruler (see "The ruler" on page 20).

- To hide or show the info line, click the Show Event Info-line button on the toolbar.

The following elements can be selected for display and editing on the info line:

- Audio events.
- Audio parts.
- MIDI parts.
- Video events.
- Markers.
- Automation curve points.

When several elements are selected

- If you have several elements selected, the info line will show information about the first item in the selection. The values will be shown in yellow to indicate that several elements are selected.

- If you edit a value on the info line, the value change is applied to all selected elements, relatively to the current values.


If you have two audio events selected and the first is one bar long and the other two bars long, the info line shows the length of the first event (one bar). If you now edit this value to 3 bars in the info line, the other event will be resized by the same amount – and will thus be 4 bars long.

- If you press [Ctrl]/[Command] and edit on the info line, the values will be absolute instead. In our example above, both events would be resized to 3 bars. Note that [Ctrl]/[Command] is the default modifier key for this – you can change this in the Preferences (Editing–Tool Modifiers page, under the Info Line category).

Editing Transpose and Velocity for MIDI parts

When one or several MIDI parts are selected, the info line contains Transpose and Velocity fields.

- Adjusting the Transpose field transposes the selected parts in semitone steps.
Note that this transposition doesn't change the actual notes in the part – it's just a "play parameter", affecting the notes on playback. The transposition you specify for a part on the info line is added to the transposition set for the whole track with the Transpose track parameter in the Inspector.
- Adjusting the Velocity field shifts the velocity for the selected parts – the value you specify is added to the velocities of the notes in the parts.
Again, this velocity shift only affects the notes on playback, and again, the value you specify is added to the Vel.Shift. value set for the whole MIDI track in the Inspector.

 Audio events can also be transposed – see [“Real-time pitch shifting of audio events”](#) on [page 120](#).

Getting on-the-fly info with the Arrow tool

If the option “Select Tool: Show Extra Info” is activated in the Preferences dialog (Editing–Tools page), a tool tip will be shown for the Arrow tool, displaying information depending on where you point it. For example, in the Project window Event display, the tool will show the current pointer position and the name of the track and event you're pointing at.

The ruler



The ruler at the top of the event display shows the timeline. Initially, the Project window ruler uses the display format specified in the Project Setup dialog (see [“The Project Setup dialog”](#) on [page 21](#)), as do all other rulers and position displays in the project. However, you can select an independent display format for the ruler by clicking the arrow button to the right of it and selecting an option from the pop-up menu that appears (you can also bring up this pop-up menu by right-clicking anywhere in the ruler).

Option	Positions and lengths displayed as
Bars+Beats	Bars, beats, sixteenth notes and ticks. There are 120 ticks per sixteenth note.
Seconds	Hours, minutes, seconds and milliseconds.
Timecode	This format displays hours, minutes, seconds and frames. The number of frames per second (fps) is set in the Project Setup dialog (see “The Project Setup dialog” on page 21). You can choose between 24, 25, 29.97 and 30 fps or 29.97 and 30 dfps (“drop frame”).
Samples	Samples.
Time Linear	When this is selected, the ruler will be linear relative to time. This means that if there are tempo changes on the Tempo track, the distance between the bars will vary in Bars+Beats mode.
Bars+Beats Linear	When this is selected, the ruler will be linear relative to the meter position – bars and beats. This means that if there are tempo changes on the Tempo track, there still will be the same distance between bars in Bars+Beats mode. If the ruler is set to a time-based mode, the distance between seconds will vary depending on the tempo changes.

- The selection you make here affects the ruler, the info line and tool tip position values (which appear when you drag an event in the Project window).
You can also select independent formats for other rulers and position displays.
- To set the display format globally (for all windows), use the time display format pop-up on the Transport panel, or hold down [Ctrl]/[Command] and select a display format in any ruler.
- If you use the “Timecode” option and the option “Show Timecode Subframes” is activated in the Preferences (Transport page), the frames will also display subframes. There are 80 subframes per frame.

Operations

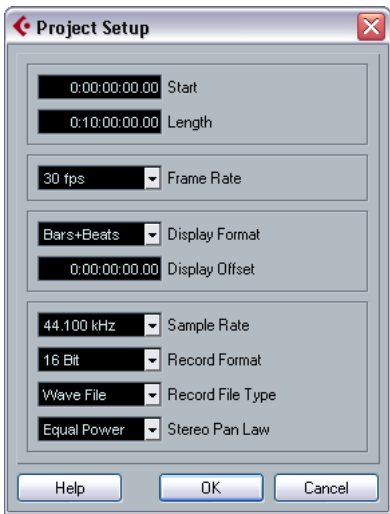
Creating a new project

You create a new project in the following way:

1. Select "New Project" from the File menu.
A dialog appears, listing a number of project templates, including any custom templates you may have created (see "Save as Template" on page 239).
2. Select a template and click OK.
A file dialog appears, allowing you to specify a location for the project folder. This will contain all files related to the project.
3. Select an existing folder or type the name of a new one. Click OK.
A Project window appears. The new project will be based on the selected template, and include tracks, events and settings from the template.

The Project Setup dialog

General settings for the project are made in the Project Setup dialog. This is opened by selecting "Project Setup..." from the Project menu.



The following settings are available in the Project Setup dialog:

Setting	Description
Start	The start time of the project. Allows you to have the project start at another time than zero. Also used for setting the sync start position when synchronizing Cubase AI to external devices (see "Setting up Cubase AI for external sync to timecode" on page 221). When you change this setting you will be asked whether you want to keep the project content at its timecode positions. "Yes" means that all events will stay at their original timecode positions – i.e. they will be moved in relation to the start of the project. "No" means that all events keep their position relative to the project start.
Length	The length of the project.
Frame Rate	Used when synchronizing Cubase AI with external equipment. If Cubase AI is slave, this value is automatically set to the frame rate of the incoming sync signal. If Cubase AI is the master, this determines the frame rate of the sent sync signal. See "Setting the Frame Rate" on page 219.
Display Format	This is the global display format used for all rulers and position displays in the program. However, you can make independent display format selections for the individual rulers and displays if you like. For descriptions of the different display format options, see "The ruler" on page 20.
Display Offset	Offsets the time positions displayed in the ruler etc., allowing you to compensate for the Start position setting. Typically, if you synchronize Cubase AI to an external source starting at a frame other than zero, you set the Start position to this value. However, if you still want the display in Cubase AI to start at zero, set the Display Offset to the same value too.
Sample Rate	The sample rate at which Cubase AI records and plays audio.
Record Format/ File Type	When you record audio in Cubase AI, the files that are created will be of this resolution and file type. See "Selecting a recording file format" on page 47.
Stereo Pan Law	Decides whether panning should use power compensation or not (see "About the "Stereo Pan Law" Preference (audio channels only)" on page 82).

⚠ While most Project Setup settings can be changed at any time, you should select a sample rate once and for all when starting with a new project! All audio files must be of this sample rate to play back correctly.

Zoom and view options

Zooming in the Project window is done according to the standard zoom techniques, with the following special notes:

- When you are using the Zoom tool (magnifying glass), the result depends on the option “Zoom Tool Standard Mode: Horizontal Zooming Only” in the Preferences (Editing–Tools page).

If this is activated and you drag a selection rectangle with the Zoom tool, the window will only be zoomed horizontally (track height will not change). If the option is off, the window will be zoomed both horizontally and vertically.

- When using the vertical zoom sliders, the tracks are scaled relatively.

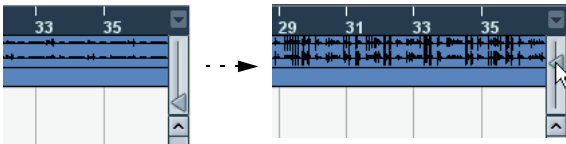
In other words, if you have made any individual track height adjustments (see below), the relative height differences are maintained.

You find the following options are available on the Zoom submenu on the Edit menu:

Option	Description
Zoom In	Zooms in one step, centering on the project cursor.
Zoom Out	Zooms out one step, centering on the project cursor.
Zoom Full	Zooms out so that the whole project is visible. “The whole project” means the timeline from the project start to the length set in the Project Setup dialog (see above).
Zoom to Selection	Zooms in horizontally and vertically so that the current selection fills the screen.
Zoom to Selection (Horiz)	Zooms in horizontally so that the current selection fills the screen.
Zoom to Event	This option is available only in the Sample Editor (see “Zooming” on page 108).
Zoom In Vertical	Zooms in one step vertically.
Zoom Out Vertical	Zooms out one step vertically.
Zoom In Tracks	Zooms in on the selected track(s) one step vertically.
Zoom Out Tracks	Zooms out the selected track(s) one step vertically.
Zoom Selected Tracks	This zooms in vertically on the selected track(s) and minimizes the height of all other tracks.

- If the option “Zoom while Locating in Time Scale” is activated in the Preferences (Transport page), you can also zoom by clicking in the main ruler and dragging up or down with the mouse button pressed. Drag up to zoom out; drag down to zoom in.

- You can zoom the contents of parts and events vertically, using the waveform zoom slider in the top right corner of the event display. This can be useful when viewing quiet audio passages.



- ⚠ To get an approximate reading on the level of the audio events by viewing the waveforms, make sure the slider is all the way down. Otherwise, zoomed waveforms may be mistaken for clipped audio.

- If you activate the option Quick Zoom in the Preferences (Editing page), the contents of parts and events will not be continuously redrawn when you zoom manually. Instead, the contents are redrawn once you have stopped changing the zoom – activate this if screen redraws are slow on your system.

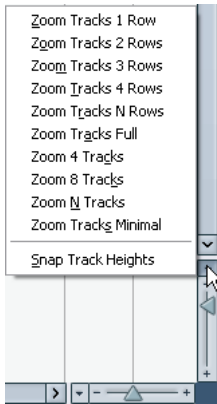
Resizing tracks in the Track list

- You can change the height of an individual track by clicking on its lower border in the Track list and dragging up or down. To change the height of all tracks simultaneously, hold down [Ctrl]/[Command] and resize one of the tracks in this way. If “Snap Track Heights” is activated on the Track scale pop-up (see below), the track height will change in fixed increments when you resize it.

- ⚠ Note that this behavior is different when “Enlarge Selected Track” is activated on the Edit menu (see below).

- You can also change the width of the Track list area, by dragging the border between the Track list and the event display.
- The controls shown for tracks in the Track list will adapt to the track size. This means that when resizing a track’s height or width the controls will be placed where they best “fit in”.

- You can use the Track scale pop-up (opened by clicking the arrow button above the vertical zoom control) to set the number of tracks to view in the current Project window. The track height will be adjusted to show only the number of tracks specified on the pop-up menu. By selecting “Zoom N Tracks” from the pop-up you can manually set the number of tracks to fit in the current Project window.



- Tracks can also be divided vertically in lanes – see [“Editing in Lane Display mode”](#) on [page 34](#).

The Enlarge Selected Track option

When this option is activated on the Edit menu (or in the Preferences dialog, Editing–Project & Mixer page), the selected track is enlarged automatically. This is useful if you are stepping through the tracks in the track list, to check or edit the settings. The tracks will revert to the size they had before when they are deselected. You can adjust the size directly in the Track list if the default enlargement factor does not suit you.

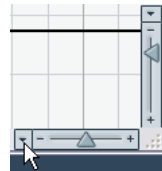
While this is the program behavior you will want in most cases, it may be a disadvantage when changing the track height you started out with for one or more tracks (i.e. their “original” height, before “Enlarge Selected Track” was activated). As soon as you try to resize a track, it is selected and automatically enlarged. Instead of turning off “Enlarge Selected Track”, resizing the desired track(s) and the activating “Enlarge Selected Track” again, you can resize a track in the Track list without selecting it.

Proceed as follows:

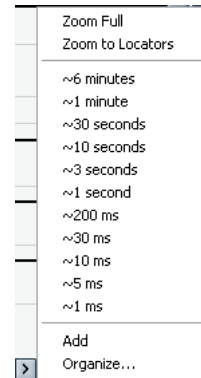
1. Move the mouse pointer over the lower border of the (unselected) track you want to resize. The mouse pointer turns into a divider symbol.
2. Hold down [Alt]/[Option] and drag the lower border of the track until it reaches the desired height. Now, when you select this track, (and “Enlarge Selected Track” is activated), it will be enlarged. It will revert to the changed size, when you select a different track.

Zoom presets and Cycle markers

The pop-up menu to the left of the horizontal zoom control allows you to select, create and organize zoom presets. These are useful if you want to toggle between different zoom settings (e.g. one where the whole project is displayed in the project window and another with a high zoom factor for detailed editing). With this pop-up menu, you can also zoom in on the area between cycle markers in the project.



Click here...



... to open the context menu

The upper part of the menu lists the zoom presets:

- To store the current zoom setting as a preset, select Add from the pop-up menu. A dialog appears, allowing you to type in a name for the preset.
- To select and apply a preset, select it from the pop-up menu.
- The “Zoom Full” preset is always available. Selecting this option zooms out so that the whole project is visible. “The whole project” means the timeline from the project start to the length set in the Project Setup dialog (see [“The Project Setup dialog”](#) on [page 21](#)).

- If you want to delete a preset, select “Organize...” from the pop-up menu.

In the dialog that appears, select the preset in the list and click the Delete button. The preset is removed from the list.

- If you want to rename a preset, select “Organize...” from the pop-up menu.

In the dialog that appears, select the desired preset in the list and click the Rename button. A second dialog opens, allowing you to type in a new name for the preset. Click OK to close the dialogs.

⚠ Zoom presets are global for all projects, i.e. they are available in all projects you open or create.

The middle part of the pop-up lists any cycle markers you have added in the project:

- If you select a cycle marker from this menu, the event display is zoomed in to encompass the marker area (see “[Zooming to cycle markers](#)” on [page 73](#)).
- You cannot edit the cycle markers in this pop-up menu. For information on editing markers, see “[The Marker window](#)” on [page 71](#).

⚠ Only the cycle markers you create in the current project are available on the menu.

Adjusting how parts and events are shown

The Preferences on the File menu (the Cubase AI menu, under Mac OS X) contains several settings for customizing the display in the Project window.

The Event Display page contains common settings for all track types:

Option	Description
Colorize Event Background	Determines whether the backgrounds or “contents” (waveforms, etc.) of parts and events will be colorized. See “ Handling tracks ” on page 25 .
Show Event Names	Determines whether the names of parts and events should be shown in the Project window.
Transparent Events	When this is activated, events and parts will be transparent, showing the waveforms and MIDI events only.
Show Data on Small Track Heights	If this is activated, the contents of events and parts will be shown, even if the height of a track is very small.

The Event Display–Video page contains settings for video events:

Option	Description
Show Video Thumbnails	When this is activated, thumbnail frames of the video contents are shown on the Video track.
Video Cache Size	This determines how much memory is available for video thumbnails. If you have long video clips and/or work with a large zoom factor (so that a lot of frames are shown in the thumbnails), you may have to raise this value.

The Event Display–Audio page contains settings for audio events:

Option	Description
Interpolate Audio Images	If the option is deactivated, single sample values are drawn as “steps”. If the option is activated they are interpolated to form “curves”.
Wave Image Style	Determines whether audio waveforms should be displayed as solid images, frames or “inverted” images (solid+frame). This selection affects all waveform images in the Project window, Sample Editor and Audio Part Editor. Note that the “Framed” and “Solid and Framed” styles are more demanding for the computer. If the system feels slower in these modes, please switch back to “Solid” wave image style.
Show Event Volume Curves Always	If this is activated the “volume curves” created with the volume and fade handles are always shown – if not, the curves are only shown for selected events.
Show Waveforms at all	Determines whether audio waveforms should be shown at all.
Background Color Modulation	When this is activated, the backgrounds of audio waveforms are displayed in a different way, reflecting the waveform dynamics. This is especially useful to get an overview when working with small track heights.

The Event Display–MIDI page contains settings for MIDI parts:

Option	Description
Default Edit Action	Determines which editor should be opened when you double-click a MIDI part or select it and press [Ctrl]/[Command]-[E]: the Key, Drum, List or Score editor. Note that this setting is overridden for tracks with drum maps if the option “Edit as Drums when Drum Map is assigned” (see below) is activated.
Part Data Mode	Determines if and how events in MIDI parts should be shown in the Project window: as lines, as score notes or as drum notes. If “No Data” is selected, events will not be shown at all. Note that this setting is overridden for tracks with drum maps if the option “Edit as Drums when Drum Map is assigned” (see below) is activated.
Show Controllers	Governs whether non-note events (controllers, etc.) should be shown in MIDI parts in the Project window.

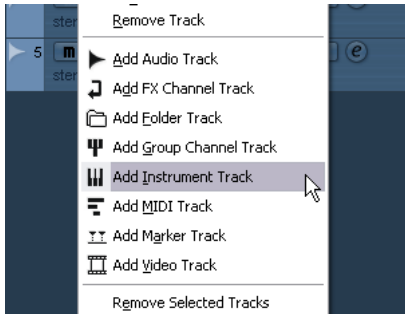
Option	Description
Edit as Drums when Drum Map is assigned	If this is activated, parts on MIDI tracks with drum maps assigned will be shown with drum note symbols in the Project window. Also, the parts will automatically open in the Drum editor when double-clicked (overriding the Default Edit Action setting above).
Note Name Style	Determines how MIDI note names (pitches) should be displayed in editors, etc.

Handling tracks

To add a track to the project, select “Add Track” from the Project menu and select a track type from the submenu that appears. The new track is added below the currently selected track in the Track list.

- The items on the “Add Track” submenu are also available on the Quick menu.

This is accessed by right-clicking in the Track list.



- If you select Audio, MIDI, Group Channel or Instrument from the Add Track submenu, a dialog opens, allowing you to insert several tracks in one go.

Just enter the desired number of tracks in the value field.

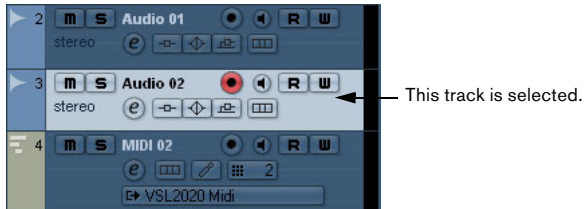
- For audio and group channel tracks, the channel configuration – mono or stereo – can be set in the Configuration pop-up.
- In the Preferences (Editing–Project & Mixer page, you can find the option “Auto Track Color Mode”. This offers you several options for automatically assigning colors to tracks that are added to the project.

Once you have created tracks, you can manipulate and rearrange them in various ways:

- To rename a track, double-click in the name field and type in a new name.

If you hold down any modifier key when pressing [Return] to close the name field, all events on the track will get the name you entered.

- To select a track, click on it in the Track list. A selected track is indicated by a light grey color in the Track list.



It is possible to select several tracks, by pressing [Ctrl]/[Command] and clicking them. To select a continuous range of tracks, use [Shift]-clicking.

- To move a track, click and drag it up or down in the list.
- To duplicate a track, complete with all contents and channel settings, right-click in the Track list and select “Duplicate track” from the context menu, or select “Duplicate track” from the Project menu. The duplicated track will appear below the original track.

- You can select a default color for a track by activating “Show Track Colors” above the Track list and selecting a color from the Color pop-up menu on the toolbar. This color will be used for all events on the track and will also be shown in the Mixer. You can override the default track color for individual events and parts by using the Color tool or the Color Selector pop-up menu.

The option “Colorize Event Background” in the Preferences dialog (Event Display page) determines whether the backgrounds or waveforms of events will be colorized.

- To remove a track, right-click on it in the Track list and select “Remove Track” from the context menu. You can also remove multiple selected tracks, by selecting “Remove Selected Tracks” either from the Project menu or from the context menu.
- To change the track height of an individual track, click on its lower border in the Track list and drag up or down, see [“Resizing tracks in the Track list”](#) on [page 22](#).

⇒ Note that you can also automatically enlarge the selected track, see [“The Enlarge Selected Track option”](#) on [page 23](#).

Disabling audio tracks

Audio tracks can be disabled by selecting “Disable Track” from the Track list context menu. Disabling a track is similar to muting it (see [“Muting events”](#) on [page 33](#)), since a disabled track will not be played back. However, disabling a track not only “zeroes” the output volume from the track, but actually shuts down all disk activity for it. See [“About track disable/enable”](#) on [page 42](#) for more information.

Adding events to a track

There are a number of ways to add events to a track:

- By recording (see [“Basic recording methods”](#) on [page 45](#)).

This is possible for audio and MIDI tracks.

- By selecting “Audio File...” or “Video File...” from the Import submenu on the File menu.

This opens a file dialog, allowing you to locate the file you wish to import. When you import a file this way, a clip is created for the file and an event that plays the whole clip is inserted on the selected track, at the position of the project cursor.

You can also import MIDI files by using the Import submenu, but this works in a slightly different way (see [“Exporting and importing MIDI files”](#) on [page 242](#)).

- By using Copy and Paste on the Edit menu.

This allows you to copy all kinds of events between projects. You can also copy events within the project, from the Audio Part Editor or Sample Editor.

- By drawing.

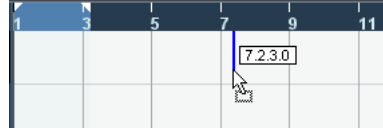
Some types of events (markers and automation events) can be drawn directly into the Project window. For audio and MIDI tracks, you can draw parts (see [“Creating parts”](#) on [page 27](#)).

- By dragging files and dropping them on the track at the desired position.

You can create events by dragging and dropping from the following locations:

- The desktop.
- The Pool.
- The “Find media” dialog.
- The Project window of another open project.
- The Audio Part Editor of any open project.

- The Sample Editor of any open project – press [Ctrl]/[Command] and drag to create an event of the current selection.



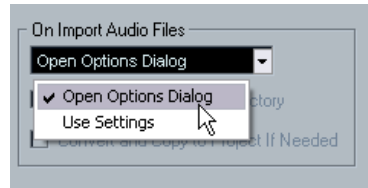
While you drag the clip in the Project window, its position will be indicated by a marker line and a numerical position box. See also [“By using drag and drop”](#) on [page 132](#).

Audio file import options

When you are importing audio files there are a number of options concerning how the files should be treated by Cu-base AI:

- You can choose to copy the file into the audio folder of the project and have the project make reference to the copied file rather than the original file. This helps you keep your project “self-contained”.
- Furthermore, you may want all files in the project to have the same sample rate and sample size (resolution).

The Preferences dialog (Editing–Audio page) contains a setting that lets you decide which options to use. Select the desired option on the “On Import Audio Files” pop-up:



- Open Options Dialog.

An Options dialog appears when you import, allowing you to select whether you want to copy the files to the Audio folder and/or convert them to the project settings. Note:

- When importing a single file of a format other than the project settings, you can specify which properties (sample rate and/or resolution) should be changed.
- When importing multiple files at the same time, you can select to convert the imported files automatically if necessary, i.e. if the sample rate is different than the project’s or the resolution is lower than the project setting.

- Use Settings.

No Options dialog will appear when you import. Instead, you can choose to make any of the options below the pop-up the standard action(s). Activate any number of the following options to have them performed automatically each time you import audio files:

Option	Description
Copy Files to Working Directory	If files are not already in the project's audio folder they are copied there before being imported.
Convert and Copy to Project If Needed	If files are not already in the project's audio folder they are copied there before being imported. Furthermore, if the files have a different sample rate or a lower resolution than the project settings, they are automatically converted.

Creating parts

Parts are containers for MIDI or audio events. If you record MIDI, a MIDI part is automatically created, containing the recorded events. You can also create empty audio or MIDI parts and later add events to them. There are two ways to do this:

- Draw a part on a MIDI or audio track with the Pencil tool. You can also draw parts by pressing [Alt]/[Option] and using the Arrow tool.
- Double-click with the Arrow tool on a MIDI or audio track, between the left and right locator.



To add events to a MIDI part, you use the tools and functions in a MIDI editor (see [“The Key Editor – Overview”](#) on [page 168](#)). Adding events to audio parts is done in the Audio Part Editor (see [“Window overview”](#) on [page 113](#)) by pasting or by using drag and drop.

- You can also gather existing audio events into a part, by using the “Events to Part” function on the Audio menu. This creates an audio part containing all selected audio events on the same track. To remove the part and make the events appear as independent objects on the track again, select the part and use the “Dissolve Part” function on the Audio menu.

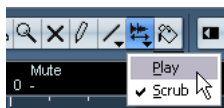
Auditioning audio parts and events

Audio parts and events can be auditioned in the Project window with the Speaker tool:

⚠ When auditioning, the Main Mix bus is used.

1. Select the Play tool.

Note that the Play tool and the Scrub tool share the same tool button. If the tool icon on the toolbar doesn't show a speaker symbol, first click on the icon to select it, then click again and select “Play” from the pop-up menu that appears.



2. Click where you want playback to start, and keep the mouse button pressed.

Only the track on which you click is played back, starting at the click position.

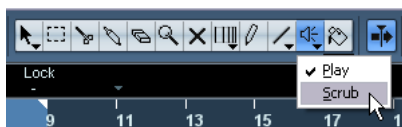
3. Release the mouse button to stop playback.

Scrubbing

The Scrub tool allows you to locate positions in the audio by playing back, forwards or backwards, at any speed:

1. Select the Scrub tool.

Note that the Play tool and the Scrub tool share the same tool button. If the tool icon on the toolbar doesn't show a “scrub symbol”, first click on the icon to select it, then click again and select “Scrub” from the pop-up menu that appears.



2. Click at the desired position and keep the mouse button pressed.

The project cursor is moved to the position at which you click.

3. Drag to the left or right.

The project cursor follows the mouse pointer and the audio is played back. The speed and pitch of the playback depend on how fast you move the pointer.

You can adjust the responsiveness of the Scrub function in the Preferences (VST–Scrub page).

- Note that scrubbing can be quite a burden on your system. To avoid playback problems, you will find the “CPU Saving Scrub Mode” option in the Preferences (VST–Scrub page).

When you activate this option, scrubbing will be less demanding on the processor. This can be very useful when scrubbing in a large project, where the “normal” scrub behavior leads to processing overloads. When “CPU Saving Scrub Mode” is activated, the effects are disabled for scrubbing and the resampling quality is lower.

Editing parts and events

This section describes techniques for editing in the Project window. If not explicitly stated, all descriptions apply to both events and parts, even though we use the term “event” for convenience.

⇒ When you are using the tools for editing, you can in many cases get additional functions by pressing modifier keys (e.g. pressing [Alt]/[Option] and dragging with the Arrow tool creates a copy of the dragged event).

On the following pages, the default modifier keys are described – you can customize these in the Preferences (Editing–Tool Modifiers page), see “Setting up tool modifier keys” on page 254.

Selecting events

Selecting events is done using any of the following methods:

- Use the Arrow tool.
The standard selection techniques apply.
- Use the Select submenu on the Edit menu.
The options are:

Option	Description
All	Selects all events in the Project window.
None	Deselects all events.
In Loop	Selects all events that are partly or wholly between the left and right locator.
From Start to Cursor	Selects all events that begin to the left of the project cursor.
From Cursor to End	Selects all events that end to the right of the project cursor.
Select Controllers in Note Range	This is available in the MIDI Editors (see “Selecting controllers within the note range” on page 174).
All on Selected Tracks	Selects all events on the selected track.
Select Event	This is available in the Sample Editor (see “Window overview” on page 106).

Option	Description
Left/Right Selection Side to Cursor	These two functions are only used for range selection editing (see “Creating a selection range” on page 35).

⚠ Note that these functions work differently when the Range Selection tool is selected (see “Creating a selection range” on page 35).

- Select all events on a track by right-clicking in its Track list and selecting “Select All Events” from the pop-up menu that appears.

- You can also use the arrow keys on the computer keyboard to select the closest event to the left, right, above or below.

If you press [Shift] and use the arrow keys, the current selection will be kept, allowing you to select several events.

- If the option “Auto Select Events under Cursor” is activated in the Preferences (Editing page), all events on the selected track(s) that are “touched” by the project cursor are automatically selected.

This can be helpful when rearranging your project, since it allows you to select whole sections (on all tracks) by selecting all tracks and moving the project cursor.

- It is also possible to select ranges, regardless of the event and track boundaries.

This is done using the Range Selection tool (see “Range editing” on page 35).

- Note that in the Preferences (Editing page), you can find the option “Use Up/Down Navigation Commands for selecting Tracks only”.

By default, tracks are selected with the up/down arrow keys on the computer keyboard. However, these are also used for selecting events (see above) which can lead to confusing results in some cases. Since track selection is a most vital operation in both editing and mixing, you have the option to use the navigation controls for track selection only. The following applies:


- When this option is deactivated and no event/part is selected in the Project window, the up/down arrow keys on the computer keyboard are used to step through the tracks in the Track list – just as you would expect this to work.
- When this option is deactivated and an event/part is selected in the Project window, the up/down arrow keys still step through the tracks in the Track list – but on the currently selected track, the first event/part will automatically be selected as well. If this is not the desired behavior, you have to activate “Use Up/Down Navigation Commands for selecting Tracks only”.

- When this option is activated, the up/down arrow keys are only used to change the track selection – the current event/part selection in the Project window will not be altered.
- Also in the Preferences (Editing–Tools page), you can find the Cross Hair Cursor options section.
This allows you to display a cross hair cursor when working in the Project window and editors, facilitating navigation and editing, especially when arranging in large projects. You can set up the colors for the line and the mask of the cross hair cursor, and define its width. The cross hair cursor works as follows:
 - When the Selection tool (or one of its subtools) is selected, the cross hair cursor appears when you start moving/copying a part/event, or when using the event trim handles.
 - When the Pencil tool, the Scissors tool or any other tool that makes use of this function is selected, the cross hair cursor appears as soon as you move the mouse over the event display.
 - The cross hair cursor is only available for tools where such a function is of any use. The Mute tool for example does not use a cross hair cursor, as you have to click directly on an event to mute it.

Moving events

To move events in the Project window, use the following methods:

- Click and drag to a new position.
All selected events will be moved, maintaining their relative positions. You can only drag events to tracks of the same type. If Snap is activated, this determines to which positions you can move the events (see [“Snap”](#) on [page 37](#)).
Note also that you can restrict movement to be either horizontal or vertical only, by holding down [Ctrl]/[Command] while dragging.

 You will note that there is a slightly delayed response when you move an event by dragging. This helps you avoid accidentally moving events when you click on them in the Project window. You can adjust this delay with the Drag Delay setting in the Preferences (Editing page).

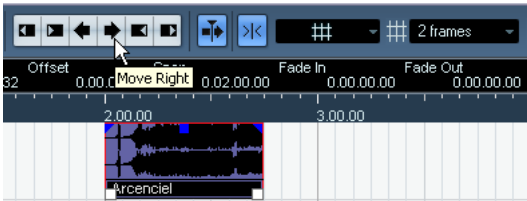
- Select the event and edit the Start position in the info line.
- Use the “Move to” functions on the Edit menu.

The following functions are available:


Function	Description
Move to Cursor	Moves the selected event to the project cursor position. If there are several selected events on the same track, the first event will start at the cursor, and the following will be lined up end-to-start after the first one.

Function	Description
Move to Origin	Moves the selected events to their original positions, i.e. the positions at which they were originally recorded.
Move to Front, Move to Back	This function doesn't actually change the position of the events, but moves the selected events to the front or back, respectively. This is useful if you have overlapping events, and want to see one that is partially obscured. For audio events, this is an extra important feature, since only the visible sections of events will be played back. Moving an obscured audio event to front (or moving the obscuring event to back) will allow you to hear the whole event on playback.

- Use the Nudge buttons in the toolbar.
These move the selected events to the left or right. The amount of movement depends on the selected display format (see [“The Project Setup dialog”](#) on [page 21](#)) and the value set on the Grid pop-up menu.



Here, clicking this button will move the event 2 frames to the right.

 When the Range Selection tool is used, the Nudge buttons move the selection range (see [“Moving and duplicating”](#) on [page 36](#)).

⇒ The Nudge buttons are not visible in the toolbar by default.

You can decide which items should be visible by right-clicking in the toolbar and checking them in the pop-up menu that appears. See [“The Setup dialogs”](#) on [page 245](#) for more information.

Duplicating events

Events can be duplicated in the following ways:

- Hold down [Alt]/[Option] and drag the event to a new position.

If Snap is activated, this determines to which positions you can copy the events (see “Snap” on page 37).

⚠ If you hold down [Ctrl]/[Command] as well, movement direction is restricted to either horizontal or vertical. That means if you drag an event vertically it can not be moved horizontally at the same time.

- Audio and MIDI parts can also be duplicated by pressing [Alt]/[Option] + [Shift] and dragging.

This creates a shared copy of the part. If you edit the contents of a shared copy, all other shared copies of the same part are automatically edited in the same way.



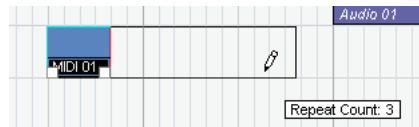
Shared copies are indicated by an icon in the right corner of the part.

Note:

- When you duplicate audio events, the copies are always shared. This means that shared copies of audio events always refer to the same audio clip (see “Audio processing” on page 100).
- You can convert a shared copy to a real copy by selecting “Convert to Real Copy” from the Edit menu. This creates a new version of the clip (that can be edited independently) and adds this to the Pool. Note that no new files are created by this operation.
- Selecting “Duplicate” from the Edit menu creates a copy of the selected event and places it directly after the original.
If several events are selected, all of these are copied “as one unit”, maintaining the relative distance between the events.
- Selecting “Repeat...” from the Edit menu opens a dialog, allowing you to create a number of copies (regular or shared) of the selected event(s).
This works just like the Duplicate function, but you can specify the number of copies.

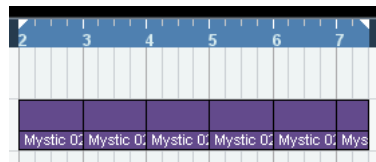
- You can also perform the Repeat function by dragging: Select the event(s) to repeat, press [Alt]/[Option], click the handle in the lower right corner of the last selected event and drag to the right.

The longer to the right you drag, the more copies are created (as shown by the tooltip).



- Selecting “Fill Loop” from the Edit menu creates a number of copies starting at the left locator and ending at the right locator.

The last copy is automatically shortened to end at the right locator.



Using Cut, Copy and Paste

You can cut or copy selected events, and paste them in again, using the functions on the Edit menu.

- When you paste an event it is inserted on the selected track, positioned so that its snap point is aligned with the cursor position.

If the selected track is of the wrong type, the event will be inserted on its original track. See “Snap” on page 37 for information about the snap point.

- If you use the “Paste at Origin” function, the event is pasted at its original position (the position from which you cut or copied it).

Renaming events

By default, audio events show the name of their clip, but you can enter a separate descriptive name for separate events if you like. This is done by selecting the event and typing in a new name in the “Description” field in the info line.

- You can also give all events on a track the same name as the track by changing the track name, holding down a modifier key and pressing [Return].

See “Handling tracks” on page 25.

Splitting events

You can split events in the Project window in the following ways:

- Click with the Scissors tool on the event you want to split.

If Snap is activated, this determines the exact split position (see [“Snap”](#) on [page 37](#)). You can also split events by pressing [Alt]/[Option] and clicking with the Arrow tool.

- Select **“Split at Cursor”** from the Edit menu.

This splits the selected events at the position of the project cursor. If no events are selected, all events (on all tracks) that are intersected by the project cursor will be split.

- Select **“Split Loop”** from the Edit menu.

This splits events on all tracks at the left and right locator positions.

⇒ If you split a MIDI part so that the split position intersects one or several MIDI notes, the result depends on the option **“Split MIDI Events”** in the Preferences (Editing–MIDI page).

If the option is activated, the intersected notes will be split (creating new notes at the beginning of the second part). If it is deactivated, the notes will remain in the first part, but **“stick out”** after the end of the part.

Gluing events together

You can glue events together using the Glue Tube tool. There are three possibilities:

- Clicking on an event with the Glue Tube tool glues it together with the next event on the track. The events do not have to touch one another.

The result is a part containing the two events, with one exception: If you first split an event and then glue the two sections together again (without moving or editing them first), they become a single event again.

- You can select several events on the same track and click on one of them with the Glue Tube tool.

A single part is created.

- When you hold down [Alt]/[Option] while clicking on an event with the Glue Tube tool, this event will be glued together with all following events on this track.

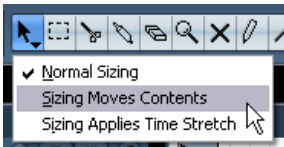
You can change the default key command for this in the Preferences (Editing–Tool Modifiers page).

Resizing events

Resizing events means to move their start or end positions individually. In Cubase AI, there are three types of resizing:

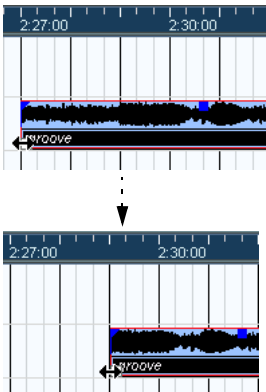
Resizing type	Description
Normal Sizing	The contents of the event stay fixed, and the start or end point of the event is moved to “reveal” more or less of the contents.
Sizing Moves Contents	The contents follow the moved start or end of the event (see the figure below).
Sizing Applies Time Stretch	The contents will be time stretched to fit the new event length (see the separate description on “Resizing events using time stretch” on page 32).

To select one of the resizing modes, select the Arrow tool and then click again on the Arrow tool icon on the toolbar. This opens a pop-up menu from which you can select one of the resizing mode options.

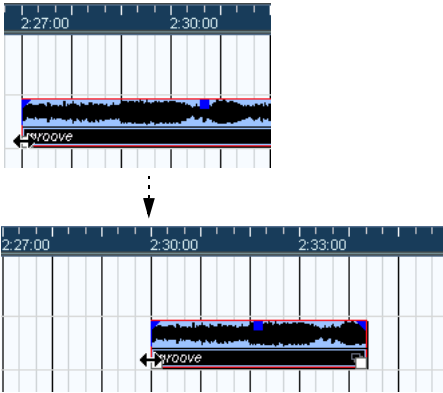


The icon on the toolbar will change, indicating the selected resizing mode.

The actual resizing is done by clicking and dragging the lower left or right corner of the event. If Snap is activated, the Snap value determines the resulting length (see [“Snap”](#) on [page 37](#)).

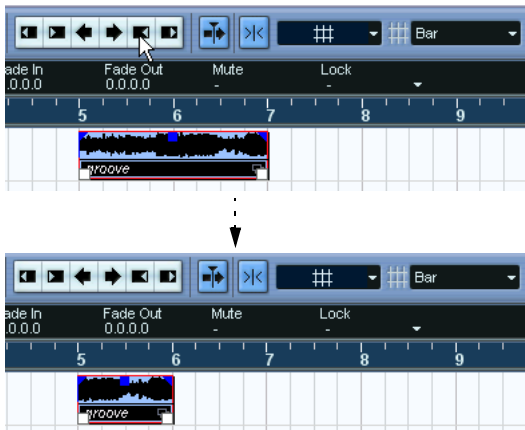


Normal sizing.



Sizing moves contents.

- If several events are selected, all will be resized in the same way.
- You can also resize events with the Scrub tool. This works just the same as when resizing with the Arrow tool, but the audio under the pointer is played back (scrubbed) while you drag.
- It is also possible to resize events by using the Trim buttons (located in the Nudge palette) on the toolbar. This will move the start or end position of the selected Event(s) by the amount set on the Grid pop-up menu. The sizing type currently selected applies to this method too, with the exception of "Sizing Applies Time Stretch" which is not possible with this method. You can also use key commands for this (by default, press [Ctrl]/[Command] and use the left and right arrow key).



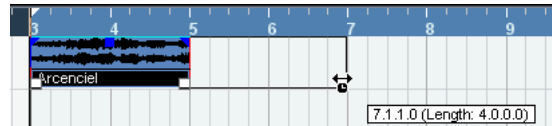
⇒ Note that the Nudge palette is not visible in the toolbar by default. See ["The Setup dialogs"](#) on [page 245](#) for instructions on how to show and hide items in the toolbar.

Resizing events using time stretch

If you want to resize a part and make its contents "fit" the new size, you should use this option. Proceed as follows:

1. Click the Arrow icon on the toolbar and select the "Sizing Applies Time Stretch" option from the pop-up menu.
2. Point close to the end point of the part you want to stretch.
3. Click and drag left or right.

When you move the mouse, a tooltip shows the current mouse position and length of the part. Note that the snap value applies, as with any part operation.



4. Release the mouse button.

The part is "stretched" or "compressed" to fit the new length.



- For MIDI parts, this means that the note events are stretched (moved and resized). Controller data will be moved.
- For audio parts, this means that the events are moved, and that the referenced audio files are time stretched to fit the new length. A dialog box shows the progress of the time stretch operation.

Sliding the contents of an event or part

You can move the contents of an event or part without changing its position in the Project window. By default, this is done by pressing [Ctrl]/[Command]+[Alt]/[Option], clicking in the event or part and dragging to the left or right.

- ⚠ When sliding the contents of an audio event, you cannot slide past the start or end of the actual audio clip. If the event plays the whole clip, you cannot slide the audio at all.

Muting events

To mute individual events in the Project window, proceed as follows:

- To mute or unmute a single event, click on it with the Mute tool.



- To mute or unmute several events, select them – either by using the standard selection techniques, or by using one of the options on the Select submenu on the Edit menu – and click on one of the selected events with the Mute tool.

All selected events will be muted.

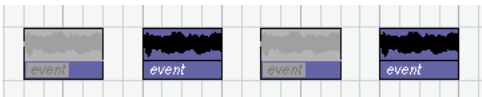
- You can also click in an empty area with the Mute tool and drag a selection rectangle around several events you want to mute or unmute, and then click on one of them with the Mute tool.

- You can mute events by selecting them and selecting “Mute” from the Edit menu.

Similarly, you can unmute the selected events by selecting “Unmute” from the Edit menu.

- You can also change the mute status of selected events on the info line.

Muted events can be edited as usual (with the exception of adjusting fades), but are not played back.



Muted events are “greyed out”.

- You can also mute whole tracks by clicking the Mute (“M”) button in the Track list, the Inspector or the mixer. Clicking the Solo (“S”) button for a track mutes all other tracks. Note that there are two modes for the track solo function: If the option “Enable Solo on Selected Track” is activated in the Preferences (Editing–Project & Mixer page) and you have soloed a track, selecting another track in the track list will automatically solo that track instead – the solo state “moves” with the track selection. If the option isn’t activated, the track you solo stays soloed, regardless of the selection.

Removing events

To remove an event from the Project window, use any of the following methods:

- Click on the event with the Eraser tool.

Note that if you press [Alt]/[Option] while you click, all following events on the same track will be deleted, but not the event you clicked and all events before it.

- Select the event(s) and press [Backspace], or select “Delete” from the Edit menu.

Creating new files from events

An audio event plays a section of an audio clip, which in turn refers to one or more audio files on the hard disk. However, in some situations you may want to create a new file that consists only of the section played by the event. This is done with the function “Bounce Selection” on the Audio menu:

1. Select one or several audio events.
2. Set up fade in, fade out and event volume (on the info line or using the volume handle) as desired. These settings will be applied to the new file. For details on fades and event volume, see [“Creating fades”](#) on [page 59](#).
3. Select “Bounce Selection” from the Audio menu. You are asked whether you want to replace the selected event or not.
 - If you click “Replace”, a new file is created, containing only the audio in the original event. A clip for the new file is added to the Pool, and the original event is replaced by a new event playing the new clip.

- If you click “No”, a new file is created and a clip for the new file is added to the Pool. The original event is not replaced.

You can also apply the Bounce Selection function to an audio part. In that case, the audio from all events in the part will be combined into a single audio file. If you choose “Replace” when asked, the part will be replaced with a single audio event playing a clip of the new file.

Editing in Lane Display mode

You can select the lane mode manually for individual tracks, and use it when editing in the Project window. This makes it easier to view and handle overlapping events and parts.

Audio tracks

1. In the Track list or in the Inspector for the selected track, click the Lane Display Type button and select “Lanes Fixed” from the pop-up menu.

The audio track is divided vertically into two lanes. By default, all audio events end up in the first (top) lane.



2. Now you can move events or parts between lanes, either by dragging or by using the “Move to Next Lane/Previous Lane” commands on the Edit menu or Quick menu. Note that if there are overlapping audio events, the audio on the lowest lane has playback priority – moving events between lanes affects what will be heard!



If the vertical zoom factor is sufficiently high, the sections that will be heard on playback are indicated in green.

- Note that there will always be an extra, empty lane at the bottom of the track – moving an event there always will add another lane.

Depending on the number of lanes used, you may want to adjust the vertical zoom for the track – simply drag the track edges in the track list.

3. After rearranging the overlapping events so that you hear what you want, you can select all events and select “Delete Overlaps” from the Advanced submenu on the Audio menu.

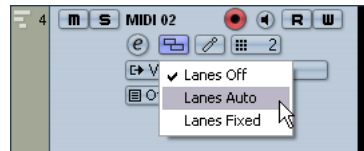
This puts all events in the top lane and resizes events so that overlapping sections are removed.

4. To turn off Lanes mode, select “Lanes Off” from the Lane Display Type pop-up menu.

If you do this without using the “Delete Overlaps” function, all overlapping sections will be kept. However, the sections that were green will now be the sections visible (“on top”) and thus the sections that will be heard.

MIDI tracks

1. In the Track list or in the Inspector for the selected track, click the Lane Display Type button and select “Lanes Auto” or “Lanes Fixed”.



- In Lanes Auto mode, extra lanes will automatically be added where necessary – if two MIDI parts overlap, they will automatically be put on separate lanes.
- In Lanes Fixed mode, you have to move MIDI parts between lanes manually (by dragging them or by using the “Move to Next Lane/Previous Lane” commands on the Edit menu or Quick menu).

In this mode, there will always be an extra, empty lane at the bottom of the track – if you move a part there, another lane will be added and so on.

2. You can edit the overlapping parts as usual – by cutting, deleting or muting sections in the Project window or by opening them in a MIDI editor.

In an editor, parts on different lanes will be treated just like parts on different tracks – you can use the part list pop-up menu to select an active part for editing, etc.

Note that there is no playback priority between lanes on a MIDI track – all unmuted parts will be heard during playback.

3. To turn off Lanes mode, select “Lanes Off” from the Lane Display Type pop-up menu.

Range editing

Editing in the Project window isn't necessarily restricted to handling whole events and parts. You can also work with selection ranges, which are independent from the event/part and track boundaries.

Creating a selection range

To make a selection range, drag with the Range Selection tool.



When the Range Selection tool is selected, the Select submenu on the Edit menu has the following items for making selection ranges:

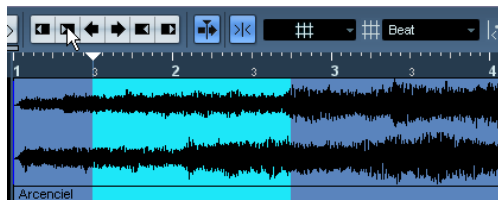
Option	Description
All	Makes a selection that covers all tracks, from the start of the project to the end (as defined by the Length setting in the Project Setup dialog).
None	Removes the current selection range.
In Loop	Makes a selection between the left and right locator, on all tracks.
From Start to Cursor	Makes a selection on all tracks, from the start of the project to the project cursor.
From Cursor to End	Makes a selection on all tracks, from the project cursor to the end of the project.
All on Selected Tracks	Only used for event selection (see "Selecting events" on page 28).
Select Event	This is available in the Sample Editor (see "Using the Select submenu" on page 110).
Left Selection Side to Cursor	Moves the left side of the current selection range to the project cursor position.
Right Selection Side to Cursor	Moves the right side of the current selection range to the project cursor position.

- Double-clicking on an event with the Range Selection tool creates a selection range encompassing the event. If you hold down [Shift] you can double-click several events in a row, and the selection range will expand to encompass them all. Double-clicking a second time on an event opens it for editing in the Sample Editor.

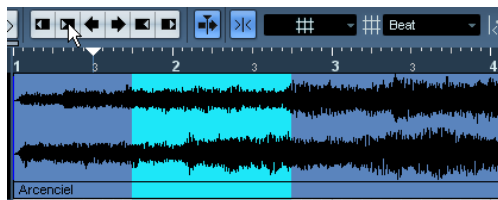
Adjusting the size of the selection range

You can adjust the size of a selection range in the following ways:

- By dragging its edges.
The pointer takes the shape of a double arrow when you move it over an edge of the selection range.
- By holding down [Shift] and clicking.
The closest selection range edge will be moved to the position at which you clicked.
- By adjusting the selection range start or end position on the info line.
- By using the Trim buttons on the toolbar.
The left Trim buttons will move the start of the selection range and the right buttons will move the end. The edges will be moved by the amount specified on the Grid pop-up.



Clicking this Trim button...



...will move the start of the selection range to the right by 1 Beat.

- By using the Nudge buttons on the toolbar.
These will move the whole selection range to the left or the right. The amount of movement depends on the selected display format (see ["The Project Setup dialog"](#) on [page 21](#)) and the value specified on the Grid pop-up menu.

⚠ Note that the contents of the selection are not moved – using the Nudge buttons is the same as adjusting the start and end of the selection range at the same time, by the same amount.

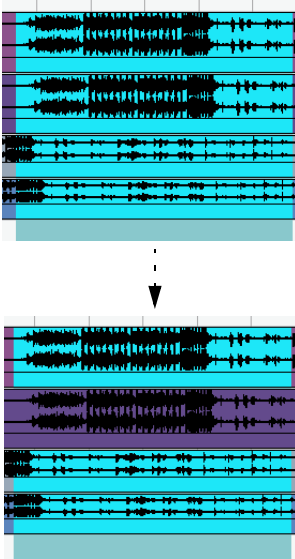
⇒ The Trim buttons and the Nudge buttons are located in the Nudge palette, which is not visible in the toolbar by default.

See [“The Setup dialogs”](#) on [page 245](#) for instructions on how to show and hide items in the toolbar.

Making selection ranges for several non-contiguous tracks

As described above, selection ranges can cover several tracks. However, it is also possible to exclude tracks from a selection range:

1. Create a selection range from the first to the last desired track.
2. Press [Ctrl]/[Command] and click in the selection range on the tracks you want to exclude from the selection.



3. In the same manner, you can add a track to the selection range by [Ctrl]/[Command]-clicking in the selection range area on the track.

Moving and duplicating

- To move a selection range, click and drag it to a new position.

This will move the contents of the selection range to the new position. If the range intersected events or parts, these will be split before moving, so that only the sections within the selection range are affected.

- To duplicate a selection range, hold down [Alt]/[Option] and drag.

You can also use the Duplicate, Repeat and Fill Loop functions, just as when duplicating events (see [“Duplicating events”](#) on [page 30](#)).

Using Cut, Copy and Paste

When working with selection ranges, you can either use Cut, Copy and Paste on the Edit menu, or use the functions “Cut Time” and “Paste Time” on the Range submenu on the Edit menu. These work differently to their related functions on the Edit menu:

Function	Description
Cut	Cuts out the data in the selection range and moves it to the clipboard. The selection range is replaced by empty track space in the Project window, meaning that events to the right of the range keep their positions.
Copy	Copies the data in the selection range to the clipboard.
Paste	Pastes the clipboard data at the start position and track of the current selection. Existing events are not moved to make room for the pasted data.
Paste at Origin	Pastes the clipboard data back at its original position. Existing events are not moved to make room for the pasted data.
Cut Time	Cuts out the selection range and moves it to the clipboard. Events to the right of the removed range are moved to the left to fill out the gap.
Paste Time	Pastes the clipboard data at the start position and track of the current selection. Existing events are moved to make room for the pasted data.
Paste Time at Origin	Pastes the clipboard data back at its original position. Existing events are moved to make room for the pasted data.

Deleting selection ranges

Again, you can either use “regular” Delete or “Delete Time”:

- If you use the Delete function on the Edit menu (or press [Backspace]), the data within the selection range is replaced by empty track space. Events to the right of the range keep their position.
- If you use “Delete Time” on the Edit menu’s Range submenu, the selection range is removed and events to the right are moved to the left to close up the gap.

Other functions

On the Range submenu on the Edit menu, you will find three more range editing functions:

Function	Description
Split	Splits any events or parts that are intersected by the selection range, at the positions of the selection range edges.
Crop	All events or parts that are partially within the selection range are cropped, that is, sections outside the selection range are removed. Events that are fully inside or outside the selection range are not affected.
Insert Silence	Inserts empty track space from the start of the selection range. The length of the silence equals the length of the selection range. Events to the right of the selection range start are moved to the right to “make room”. Events that are intersected by the selection range start are split, and the right section is moved to the right.

Options

Snap

The Snap function helps you to find exact positions when editing in the Project window. It does this by restricting horizontal movement and positioning to certain positions. Operations affected by Snap include moving, copying, drawing, sizing, splitting, range selection, etc.

- You turn Snap on or off by clicking the Snap icon in the toolbar.

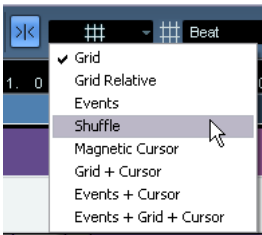


Snap activated.

⇒ When you are moving audio events with Snap activated, it isn't necessarily the beginning of the event that is used as Snap position reference. Instead, each audio event has a snap point, which you can set to a relevant position in the audio (such as a downbeat, etc.).

The snap point is set in the Sample Editor since it allows for a higher degree of precision (see [“Adjusting the snap point”](#) on [page 109](#)).

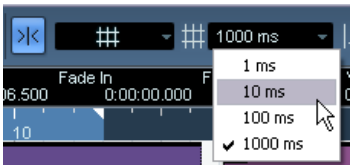
Exactly how Snap works depends on which mode is selected on the Snap mode pop-up menu.



The following sections describe the different Snap modes.

Grid

In this mode, the Snap positions are set with the Grid pop-up menu to the right. The options depend on the display format selected for the ruler. For example, if the ruler is set to show bars and beats, the grid can be set to bars, beats or the quantize value set with the next pop-up menu to the right. If a time or frame-based ruler format is selected, the grid pop-up menu will contain time or frame-based grid options, etc.



When Seconds is selected as ruler format, the grid pop-up menu contains time-based grid options.

Grid Relative

When you move events and parts in this mode they will not be “magnetic” to the grid. Rather, the grid determines the step size for moving the events. This means that a moved event will keep its original position relative to the grid.

For example, if an event starts at the position 3.04.01 (one beat before bar 4), Snap is set to Grid Relative and the Grid pop-up is set to “Bar”, you can move the event in steps of one bar – to the positions 4.04.01, 5.04.01 and so on. The event will keep its relative position to the grid, i.e. stay one beat before the bar lines.

- This only applies when dragging existing events or parts – when you create new events or parts this mode works like the Grid mode.

Events

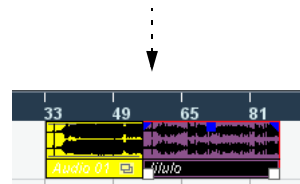
In this mode, the start and end positions of other events and parts become “magnetic”. This means that if you drag an event to a position near the start or end of another event, it is automatically aligned with the start or end of the other event. For audio events, the position of the snap point is also magnetic (see [“Adjusting the snap point”](#) on [page 109](#)).

- Note that this includes marker events on the marker track.

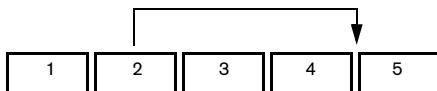
This allows you to snap events to marker positions, and vice versa.

Shuffle

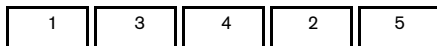
Shuffle mode is useful when you want to change the order of adjacent events. If you have two adjacent events and drag the first one to the right, past the second event, the two events will change places.



The same principle works when changing the order of more than two events:



Dragging event 2 past event 4...



...changes the order of events 2, 3 and 4.

Magnetic Cursor

When this mode is selected, the project cursor becomes “magnetic”. Dragging an event near the cursor causes the event to be aligned with the cursor position.

Grid + Cursor

This is a combination of the “Grid” and “Magnetic Cursor” modes.

Events + Cursor

This is a combination of the “Events” and “Magnetic Cursor” modes.

Events + Grid + Cursor

This is a combination of the “Events”, “Grid” and “Magnetic Cursor” modes.

Snap to Zero Crossing

When this option is activated in the Preferences (Editing–Audio page), splitting and sizing of audio events is done at zero crossings (positions in the audio where the amplitude is zero). This helps you avoid pops and clicks which might otherwise be caused by sudden amplitude changes.

- ⚠ This setting affects all windows in all open projects – with the exception of the Sample Editor (which has its own Snap to Zero Crossing button).

Autoscroll



Autoscroll activated.

When this option is activated, the waveform display will scroll during playback, keeping the project cursor visible in the window.

- If the option “Stationary Cursor” is activated in the Preferences (Transport page), the project cursor will be positioned in the middle of the screen (if possible).

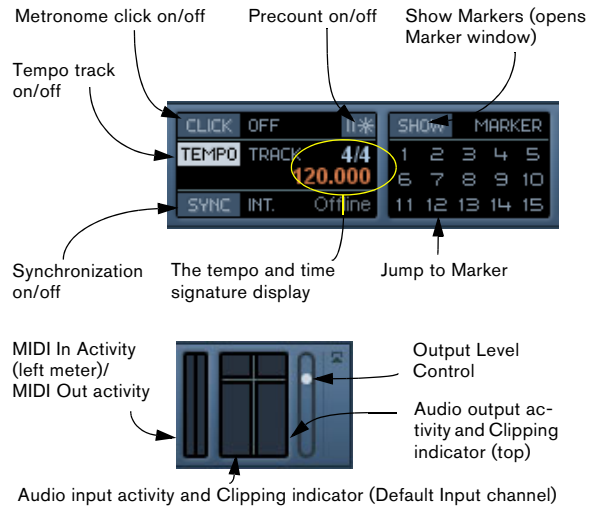
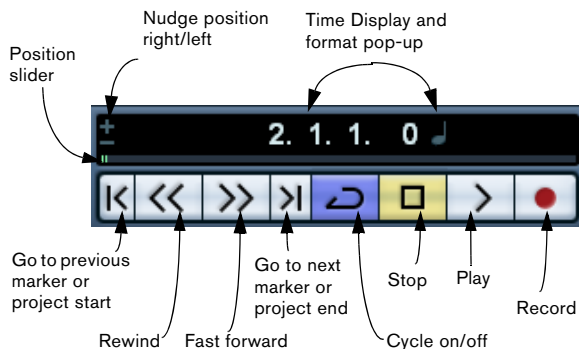
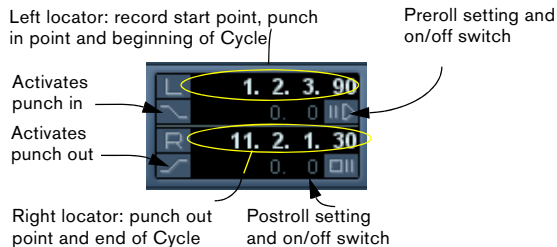
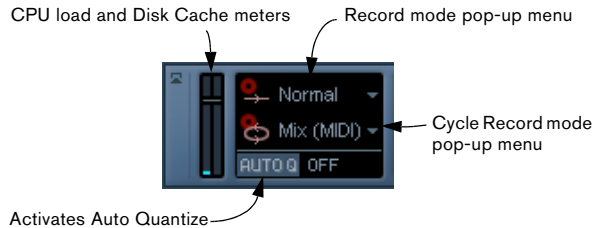
Background

This chapter describes the various methods available for controlling Playback and Transport functions in Cubase AI.

The Transport panel

Below you can find a brief description of each item on the Transport panel.

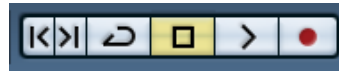
The pictures below show the Transport panel with all controls visible and in their default position. The Transport panel is divided into sections, from left to right.



Audio input activity and Clipping indicator (Default Input channel)

⇒ Note that the Output Activity and Clipping indicator as well as the Output Level Control refer to the Main Mix Output bus as defined on the Outputs tab in the VST Connections window.

- The main Transport functions (Cycle/Stop/Play/Record) can also be shown on the toolbar.



In addition, various play options are available on the Transport menu.

Hiding and showing the Transport Panel

The Transport panel is shown by default when you launch a new project. To hide or show it, select the "Transport Panel" item from the Transport menu (or use a key command – by default [F2]).

About Preroll and Postroll

These items are described in the chapter "Recording", see ["About Preroll and Postroll"](#) on [page 55](#).

Changing the Transport panel setup

You can customize the appearance of the Transport panel by right-clicking anywhere on the panel and making selections on the pop-up menu that appears.

This is explained in detail in the section [“Customizing via the setup context menus”](#) on [page 245](#).

The numeric keypad

In the default Key Command settings, various Transport panel operations are assigned to the numeric keypad on the computer keyboard. The keypads are slightly different on PC and Macintosh computers:

Numeric Key	Function
[Enter]	Play
[+]	Fast Forward
[-]	Rewind
[*]	Record
[+] (Win)/[.] (Mac)	Cycle On/Off
[.]	Return to Zero
[0]	Stop
[1]	Go to Left Locator
[2]	Go to Right Locator
[3-9]	Go to marker 3 to 9

Operations

Setting the project cursor position

There are several ways to move the project cursor position:

- By using Fast Forward and Rewind.
- By dragging the project cursor in the lower part of the ruler.
- By clicking in the ruler.
Double-clicking in the ruler moves the cursor and starts/stops playback.
- If the option “Locate when Clicked in Empty Space” is activated in the Preferences (Transport page) you can click anywhere in an empty section of the Project window to move the cursor position.
- By changing the value in the position display.
- By using the position slider above the transport buttons in the Transport panel.
The range of the slider relates to the Length setting in the Project Setup dialog. Hence, moving the slider all the way to the right will take you to the end of the project.
- By using markers (see [“About markers”](#) on [page 71](#)).

- By using playback options (see [“Playback functions”](#) on [page 43](#)).
- By using functions on the Transport menu.

The following functions are available:

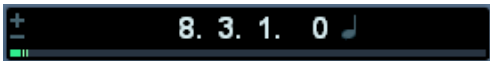
Function	Description
Locate Selection/ Locate Selection End	Moves the project cursor to the beginning or end of the current selection. For this to be available, you must have selected one or more events or parts, or made a selection range.
Locate Next/ Previous Marker	This moves the project cursor to the closest marker to the right or left (see “About markers” on page 71).
Locate Next/ Previous Event	This moves the project cursor forwards or backwards respectively, to the closest beginning or end of any event on the selected track(s).

⇒ If Snap is activated when dragging the project cursor, the Snap value is taken into account. This is helpful for finding exact positions quickly.

⇒ There are also numerous key commands available for moving the project cursor (in the Transport category in the Key Commands dialog).

For example, you can assign key commands to the “Step Bar” and “Step Back Bar” functions, allowing you to move the project cursor in steps of one bar, backwards and forwards.

About the Transport panel display format



The time display in the transport panel

The time unit shown in the ruler can be independent from the time unit shown in the time display on the Transport panel. This means that you can display timecode in the transport position display and bars and beats in the ruler, for example.

The following rules apply:

- If you change the time format of the time display on the Transport panel, the time format of the ruler will be changed as well.
This is the same as changing the display format in the Project Setup. Therefore, to have different display formats in the ruler and the time display you should change the format in the ruler.

- The time display format is set on the pop-up menu to the right in the position display.



- This setting also determines the time format displayed for the left and right locators on the Transport panel.

The left and right locators

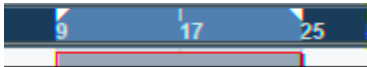
The left and right locators are a pair of position markers used for specifying punch-in and punch-out positions during recording, and as boundaries for cycle playback and recording.

⇒ When cycle mode is activated on the Transport panel, the area between the left and right locator will be repeated (cycled) on playback.

However, if the right locator is positioned before the left, this will work as a “jump” or “skip mode” – when the project cursor reaches the right locator it will immediately jump to the left locator position and continue playback from there.

There are several ways to set locator positions:

- To set the left locator, press [Ctrl]/[Command] and click at the desired position in the ruler.
- Similarly, pressing [Alt]/[Option] and clicking in the ruler sets the right locator. You can also drag the locator “handles” directly in the ruler.



The locators are indicated by the “flags” in the ruler. The area between the locators is highlighted in the ruler and in the Project window (see “Appearance” on page 246). Note that if the right locator is before the left locator, the color of the ruler between the locators will change (from blue to red).

- Click and drag in the upper half of the ruler to “draw” a locator range.

If you click on an existing locator range, you can drag to move it.

- Pressing [Ctrl]/[Command] and pressing [1] or [2] on the numeric keypad sets the left or right locator to the project cursor position.
- Similarly, you can press [1] or [2] on the numeric keypad (without [Ctrl]/[Command]) to set the project cursor position to the left or right locator position. Note that these are default key commands – you can change these if you like.

- By creating cycle markers you can store any number of left and right locator positions, which can be recalled by simply double-clicking on the corresponding marker (see “About cycle markers” on page 72).

- The “Locators to Selection” item on the Transport menu (default key command [P]) sets the locators to encompass the current selection.

This is available if you have selected one or several events or made a selection range.

- You can also adjust the locators numerically in the Transport panel.

Clicking the L/R buttons in the locator section on the Transport panel will move the project cursor to the respective locator. If you press [Alt]/[Option] and click the L or R button, the corresponding locator will be set to the current project cursor position.

Options and Settings

The “Return to Start Position on Stop” preference

This setting is found on the Transport page in the Preferences (found on the File menu under Windows, or on the Cubase AI menu under Mac OS X).

- If “Return to Start Position on Stop” is activated when you stop playback, the project cursor will automatically return to the position where recording or playback last started.

- If “Return to Start Position on Stop” is deactivated, the project cursor will remain at the position where you stop playback.

Pressing Stop again will return the project cursor to the position where recording or playback last started.

About track disable/enable


For audio tracks, the track context menu contains an item named “Disable Track”. This shuts down all disk activity for the track, as opposed to using Mute, which merely turns down the output volume for a track. For example, if you often record “alternative takes” you can easily build up a large number of takes on different tracks. Even though these tracks are muted, they are actually still “playing back” from the hard disk during playback. This puts an unnecessary load on your disk system, so using “Disable Track” is recommended for such situations.

- Select “Disable Track” for tracks that you want to keep in the project for later use (but don’t want to play back now). Select “Enable Track” from the track context menu to re-enable disabled tracks.

Playback functions

Apart from the standard transport controls on the Transport panel, you can also find a number of functions that can be used to control playback on the Transport menu. The items have the following functionality:

Option	Description
Play from Selection Start/End	Activates playback from the beginning or end of the current selection.
Play until Selection Start/End	Activates playback two seconds before the start or end of the current selection and stops at the selection start or end, respectively.
Play until Next Marker	This activates playback from the project cursor and stops at the next marker.
Play Selection Range	This activates playback from the start of the current selection and stops at the selection end.
Loop Selection	This activates playback from the start of the current selection and keeps starting over again when reaching the selection end.

 The functions listed above (except “Play until Next Marker”) are only available if you have selected one or more events or made a selection range.

About Chase

Chase is a function that makes sure your MIDI instruments sound as they should when you locate to a new position and start playback. This is accomplished by the program transmitting a number of MIDI messages to your instruments each time you move to a new position in the project, making sure all MIDI devices are set up correctly with regard to program change, controller messages (such as MIDI Volume), etc.

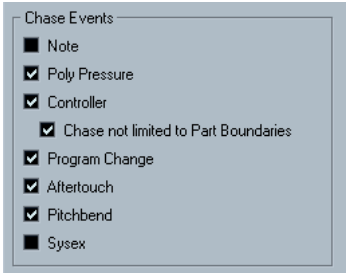
For example, let’s say you have a MIDI track with a program change event inserted at the beginning. This event makes a synth switch to a piano sound.

At the beginning of the first chorus you have another program change event which makes the same synth switch to a string sound.

You now play back the song. It begins with the piano sound and then switches to the string sound. In the middle of the chorus you stop and rewind to some point between the beginning and the second program change. The synth will now still play the string sound although in this section it really should be a piano!

The Chase function takes care of that. If program change events are set to be chased, Cubase AI will track the music back to the beginning, find the first program change and transmit it to your synth, setting it to the correct sound.

The same thing can apply to other event types as well. The Chase Events settings in the Preferences (MIDI page) determine which event types will be chased when you locate to a new position and start playback.



⇒ Event types for which the checkbox is activated here will be chased.

- In the Chase Events section of the Preferences (MIDI page), you will find the option “Chase not limited to Part Boundaries”.

When you activate this option, MIDI controllers are also chased outside the part boundaries, i.e. the Chase will be performed on the part touched by the cursor as well as on all the parts to the left of it. Please note that this option should be deactivated for very large projects, as it considerably slows down operations such as positioning and soloing. When you deactivate this option, the MIDI controllers are only chased within the parts under the position cursor.

5

Recording

Background

This chapter describes the various recording methods that you can use in Cubase AI. As it is possible to record both audio and MIDI tracks, both recording methods are covered in this chapter.

Before you start

This chapter assumes that you are reasonably familiar with certain basic recording concepts, and that the following initial preparations have been made:

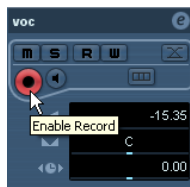
- You have properly set up, connected and calibrated your audio hardware.
- You have opened a project and set the project setup parameters to your specifications.
Project setup parameters determine the record format, sample rate, project length etc. that affect the audio recordings you make during the course of the project. See [“The Project Setup dialog”](#) on [page 21](#).
- If you plan to record MIDI, your MIDI equipment should be set up and connected correctly.

Basic recording methods

This section describes the general methods used for recording. However, there are additional preparations and procedures that are specific to audio and MIDI recording respectively. Make sure to read these sections before you start recording (see [“Audio recording specifics”](#) on [page 47](#) and [“MIDI recording specifics”](#) on [page 50](#)).

Record-enabling a track

Cubase AI can record on a single track or on several tracks (audio and/or MIDI) simultaneously. To make a track ready for recording, click the Record Enable button for the track in the Track list, in the Inspector or in the mixer. When activated, the button(s) turn red, indicating record ready mode.



Record Enable in the Inspector, Track list and mixer.

⇒ If the option “Enable Record on Selected Track” is activated in the Preferences (Editing–Project & Mixer page), tracks are automatically record-enabled when you select them in the Track list.

⇒ The exact number of audio tracks you can record simultaneously depends on your computer CPU and hard disk performance.

In the Preferences (VST page), you can find the option “Warn on Processing Overloads”. When this is activated, a warning message will be displayed as soon as the CPU clip indicator (on the Transport panel) lights up during recording.

Manually activating recording

You activate recording by clicking the Record button on the Transport panel or toolbar or by using the corresponding key command (by default [*] on the numeric keypad).

Recording can be activated in Stop mode (from the current cursor position or from the left locator) or during playback:

- If you activate recording in Stop mode, and the option “Start Record at Left Locator” is activated on the Transport menu, recording will start from the left locator. The preroll setting or the metronome count-in will be applied (see [“About Perroll and Postroll”](#) on [page 55](#)).
- If you activate recording in Stop mode, and “Start Record at Left Locator” is deactivated, recording will start from the current project cursor position.
- If you activate recording during playback, Cubase AI will immediately enter Record mode and start recording from the current project cursor position.
This is known as “manual punch in”.

Activating recording in Sync mode

If you are synchronizing the Cubase AI transport to external equipment (Sync is activated on the Transport panel) and you activate recording, the program will go into “record ready” mode (the record button on the Transport panel will light up). Recording then starts when a valid timecode signal is received (or when you manually click the Play button). See the chapter “[Synchronization](#)” on [page 216](#) for more information.

Automatically activating recording

Cubase AI can automatically switch from playback to recording at a given position. This is known as “automatic punch in”. A typical use for this would be if you need to replace a section of a recording, and want to listen to what is already recorded, up to the recording start position.

1. Set the left locator to the position where you want recording to start.
2. Activate the Punch In button on the Transport panel.



Punch In activated.

3. Activate playback from some position before the left locator.

When the project cursor reaches the left locator, recording is automatically activated.

Stopping recording

Again, this can be done automatically or manually:

- If you click the Stop button on the Transport panel (or use the corresponding key command, by default [0] on the numeric keypad), recording is deactivated and Cubase AI goes to Stop mode.
- If you click the Record button (or use the key command for recording, by default [*]), recording is deactivated but playback continues.

This is known as “manual punch out”.

- If the Punch Out button is activated on the Transport panel, recording will be deactivated when the project cursor reaches the right locator.

This is known as “automatic punch out”. By combining this with automatic punch in, you can set up a specific section to record – again very useful if you want to replace a certain part of a recording. See also “[Stop after Automatic Punch Out](#)” on [page 55](#).



Punch In and Out activated.

Cycle recording

Cubase AI can record and play back in a cycle – a loop. You specify where the cycle starts and ends by setting the left and right locators. When the cycle is active, the selected section is seamlessly repeated until you hit Stop or deactivate cycle mode.

- To activate cycle mode, click the cycle button on the Transport panel.

If you now start playback, the section between the left and right locator is repeated indefinitely until you stop.



Cycle activated

- To record in cycle mode, you can start recording from the left locator, from before the locators or from within the cycle, in Stop mode or during playback.

As soon as the project cursor reaches the right locator, it will jump back to the left locator and continue recording a new lap.

- The results of cycle recording depend on the selected cycle record mode and are different for audio (see “[Recording audio in cycle mode](#)” on [page 50](#)) and MIDI (see “[Recording MIDI in cycle mode](#)” on [page 53](#)).

Audio recording specifics

Selecting a recording file format

The format for recorded files is set in the Project Setup dialog on the Project menu. There are three settings: sample rate, record format (bit depth) and record file type. While the sample rate is set once and for all when you start working on a new project, the bit depth and file type can be changed at any time.

Record file type

The Record File Type setting determines which type of files will be created when you record:

File type	Description
Wave File	Wave files have the extension ".wav" and are a common file format on the PC platform.
AIFF File	Audio Interchange File Format, a standard defined by Apple Computer Inc. AIFF files have the extension ".aif" and are used on most computer platforms. Like Broadcast Wave files, AIFF files can contain embedded text strings (see below).

Record format (bit depth)

The available options are 16 bit and 24 bit float. Use the following guidelines:

- Normally, select the record format according to the bit depth delivered by your audio hardware.
For example, if your audio hardware has 20 bit A/D converters (inputs), you may want to record at 24 bit resolution to capture the full bit depth. On the other hand, if your hardware has 16 bit inputs, it's pointless to record with a higher bit depth – this will only make the audio files larger, with no difference in audio quality.
- The higher the bit depth, the larger the files and the more strain is put on the disk system.
If this is an issue, you may want to lower the record format setting.

! For further information on the Project Setup dialog, see ["The Project Setup dialog"](#) on [page 21](#).

Setting up the track

Creating a track and selecting the channel configuration

Audio tracks can be configured as mono or stereo. This allows you to record or import a file containing multiple channels and treat it as one entity, with no need to split it up into several mono files etc. The signal path for an audio

track maintains its channel configuration all the way from the input bus, via EQ, level and other mixer settings to the output bus.

You specify the channel configuration for a track when you create it:

1. Select "Add Audio Track" from the Track list context menu or the Project menu (or double-click in an empty area of the Track list when an audio track is selected – when a MIDI track is selected, double-clicking in the Track list creates a new MIDI track).
A dialog appears with a channel configuration pop-up menu.
2. Select the desired format from the pop-up menu.
You can choose between mono and stereo.
3. Click OK.

A track appears, set to the specified channel configuration. In the mixer, a corresponding channel strip appears. You cannot change the channel configuration for a track.

Selecting an input bus for a track

Here we assume that you have added and set up the required input busses (see ["Setting up busses"](#) on [page 10](#)). Before you record, you need to specify from which input bus the track should record. You can do this in the Inspector:

- In the Inspector, you select an input bus on the Input Routing pop-up menu in the top section.
As described in the section ["The Inspector"](#) on [page 17](#), the Inspector shows the settings for the selected track. You show or hide the Inspector clicking the "Show Inspector" button on the Project window toolbar.

Click here to show/hide the Inspector.



Click here to select an input bus for the track.

Setting input levels

When recording digital sound, it's important to set the input levels correctly – loud enough to ensure low noise and high audio quality, but not so loud that clipping (digital distortion) occurs.

Clipping typically occurs in the audio hardware when a too loud analog signal is converted to digital in the hardware's A/D converters.

You need to check the level at the channel strip for the track on which you are recording:

1. Locate the channel strip for the track you're about to record on.
2. Activate monitoring for the channel by clicking the speaker button next to the fader.

When monitoring is activated, the meter shows the level of the incoming audio signal.

3. Play the audio source that you want to record and check the level meter for the channel.
 4. Adjust the output level of your audio source so that the meters go reasonably high without reaching 0.0 dB.
- Check the numerical peak level indicator below the meter in the bus channel strip. To reset the peak level indicator, click on it.

⇒ You must adjust the output level of the audio source – you cannot use the faders in Cubase AI to adjust the input level!

⇒ An alternative way of checking the input levels would be to use the control panel for your audio hardware (if it features input level meters). It may also be possible to adjust the input level in the control panel.

See the documentation of your audio hardware for details.

Monitoring

In this context, “monitoring” means listening to the input signal during recording. There are three fundamentally different ways to do this: via Cubase AI, externally (by listening to the signal before it reaches Cubase AI), or by using ASIO Direct Monitoring (which is a combination of both other methods – see below).

Monitoring via Cubase AI

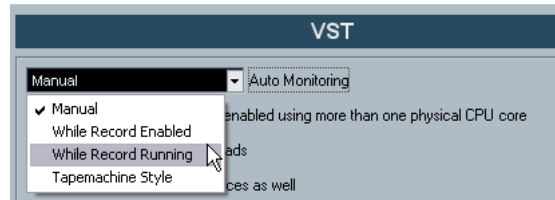
If you monitor via Cubase AI, the input signal is mixed in with the audio playback. The advantage of this is that you can adjust the monitoring level and panning in the mixer, and add effects and EQ to the monitor signal just as during playback (using the track's channel strip – not the input bus!).

The disadvantage of monitoring via Cubase AI is that the monitored signal will be delayed according to the latency value (which depends on your audio hardware and drivers). Therefore, monitoring via Cubase AI requires an audio hardware configuration with a low latency value. You can check the latency of your hardware in the Device Setup dialog (VST Audio System page).

⇒ If you are using plug-in effects with large inherent delays, the automatic delay compensation function in Cubase AI will increase the latency.

If this is a problem, you can use the Constrain Delay Compensation function while recording, see the chapter “VST Instruments” in the separate Plug-in Reference manual.

When monitoring via Cubase AI, you can select one of four Auto Monitoring modes in the Preferences (VST page):



- **Manual.**

This option allows you to turn input monitoring on or off by clicking the Monitor button in the Inspector, the Track list or in the mixer.

- **While Record Enabled.**

With this option, you will hear the audio source connected to the channel input whenever the track is record enabled.

- **While Record Running.**

This option switches to input monitoring only during recording.

- **Tapemachine Style.**

This option emulates standard tapemachine behavior: input monitoring in Stop mode and during recording, but not during playback.

External monitoring

External monitoring (listening to the input signal before it goes into Cubase AI) requires some sort of external mixer for mixing the audio playback with the input signal. This can be a stand-alone physical mixer or a mixer application for your audio hardware, if this has a mode in which the input audio is sent back out again (usually called “Thru”, “Direct Thru” or similar).

When using external monitoring, you cannot control the level of the monitor signal from within Cubase AI or add VST effects or EQ to the monitor signal. The latency value of the audio hardware configuration does not affect the monitor signal in this mode.

⇒ If you want to use external monitoring, you need to make sure that monitoring via Cubase AI isn't activated as well.

Select the “Manual” monitoring mode in the Preferences (VST page) and don't activate the Monitor buttons.

ASIO Direct Monitoring

If your audio hardware is ASIO 2.0 compatible, it may support ASIO Direct Monitoring. In this mode, the actual monitoring is done in the audio hardware by sending the input signal back out again. However, monitoring is controlled from Cubase AI. This means that the audio hardware's direct monitoring feature can be turned on or off automatically by Cubase AI, just as when using internal monitoring.

- To activate ASIO Direct Monitoring, open the Device Setup dialog on the Devices menu and check the Direct Monitoring checkbox on the VST Audio System page. If the checkbox is greyed out, your audio hardware (or its driver) doesn't support ASIO Direct Monitoring. Consult the audio hardware manufacturer for details.
- When ASIO Direct Monitoring is activated, you can select a monitoring mode in the Preferences (VST page), as when monitoring via Cubase AI (see [“Monitoring via Cubase AI”](#) on page 48).
- Depending on the audio hardware, it may also be possible to adjust monitoring level and panning from the mixer. Consult the documentation of the audio hardware if in doubt.
- VST effects and EQ cannot be applied to the monitor signal in this mode, since the monitor signal doesn't pass through Cubase AI.

- Depending on the audio hardware, there may be special restrictions as to which audio outputs can be used for direct monitoring.

For details on the routing of the audio hardware, see its documentation.

- The latency value of the audio hardware configuration does not affect the monitor signal when using ASIO Direct Monitoring.

Recording

Recording is done using any of the general recording methods (see [“Basic recording methods”](#) on page 45). When you finish recording, an audio file is created in the Audio folder within the project folder. In the Pool, an audio clip is created for the audio file, and an audio event that plays the whole clip appears on the recording track. Finally, a waveform image is calculated for the audio event. If the recording was very long, this may take a while.

⇒ If the option “Create Audio Images During Record” is activated in the Preferences (Record page), the waveform image will be calculated and displayed during the actual recording process.

This real-time calculation uses some processing power – if your processor is slow or you are working on a CPU-intensive project, you should consider turning this option off.

Undoing recording

If you decide that you don't like what you just recorded, you can delete it by selecting Undo from the Edit menu. The following will happen:

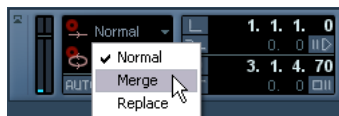
- The event(s) you just created will be removed from the Project window.
- The audio clip(s) in the Pool will be moved to the Trash folder.
- The recorded audio file(s) will not be removed from the hard disk.

However, since their corresponding clips are moved to the Trash folder, you can delete the files by opening the Pool and selecting “Empty Trash” from the Media menu, see [“Deleting from the hard disk”](#) on page 132.

Recording overlapping events

The basic rule for audio tracks is that each track can play back a single audio event at a time. This means that if two or more events are overlapping, only one of them will be heard at any given time.

What happens when you record overlapping events (record in an area where there are already events on the track) depends on the Linear Record Mode setting on the Transport panel:



- In “Normal” or “Merge” mode, recording where something has already been recorded creates a new audio event that overlaps the previous one(s).

When you record audio, there is no difference between “Normal” and “Merge” mode – the difference only applies to MIDI recording (see [“About overlap and the Record Mode setting”](#) on [page 52](#)).

- In “Replace” mode, existing events (or portions of events) that are overlapped by the new recording will be removed.

This means that if you record a section in the middle of a longer existing recording, that original event will be cut into two events with a gap for the new event.



Which event will be heard?

If two or more events are overlapping, you will only hear the events (or portions of events) that are actually visible. Overlapped (hidden) events or sections are not played back.

- The functions “Move to Front” and “Move to Back” on the Edit menu (see [“Moving events”](#) on [page 29](#)) are useful for managing overlapping events, as is the “To Front” function (see below).

Recording audio in cycle mode

If you are recording audio in cycle mode, the result depends on the “Cycle Record Mode” setting on the Transport panel:

Cycle Record Modes on the Transport panel



There are three different modes on the Transport panel. For audio cycle recording, the following applies:

- If “Keep Last” is selected, the last complete “take” (the last completely recorded lap) is kept as an audio event. You can easily select a previous take for playback.

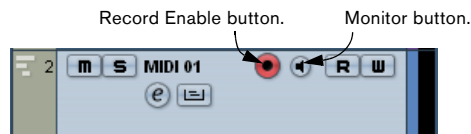
MIDI recording specifics

Activating MIDI Thru

Normally, when working with MIDI, you will have MIDI Thru activated in Cubase AI, and Local Off selected in your MIDI Instrument(s). In this mode, everything you play during recording will be “echoed” back out again on the MIDI output and channel selected for the recording track.

1. Make sure the option “MIDI Thru Active” is activated in the Preferences (MIDI page).
2. Record enable the track(s) on which you want to record.

Now, incoming MIDI is “echoed” back out again for all record-enabled MIDI tracks.



- ⇒ If you just want to use the Thru function for a MIDI track without recording, activate the monitor button for the track instead.

This is useful e.g. if you want to try out different sounds or play a VST instrument in real time without recording your playing.

Setting MIDI channel, input and output

Setting the MIDI channel in the instrument

Most MIDI synthesizers can play several sounds at the same time, each on a different MIDI channel. This is the key to playing back several sounds (bass, piano etc.) from the same instrument. Some devices (such as General MIDI compatible sound modules) always receive on all 16 MIDI channels. If you have such an instrument, there's no specific setting you need to make in the instrument. On other instruments, you will have to use the front panel controls to set up a number of "Parts", "Timbres" or similar so that they receive on one MIDI channel each. See the manual that came with your instrument for more information.

Naming MIDI ports in Cubase AI

MIDI inputs and outputs are often displayed with unnecessarily long and complicated names. However, you can rename your MIDI ports to more descriptive names:

1. Open the Device Setup dialog from the Devices menu.
2. Select the MIDI Port Setup item in the Device list. The available MIDI inputs and outputs are listed. Under Windows, which device to choose depends on your system.
3. To change the name of a MIDI port, click in the "Show As" column and type in a new name. After closing the dialog, the new name will appear on the MIDI Input and Output Routing pop-up menus.

Setting the MIDI input in the Inspector

You select MIDI inputs for tracks in the Inspector (the area to the left of the Track list in the Project window):

1. If the Inspector is hidden, click the Show Inspector button on the toolbar.



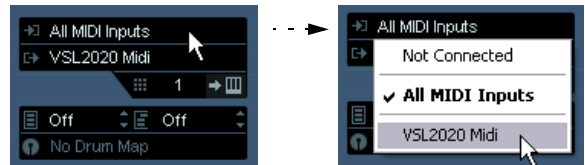
2. Select the track(s) by clicking in the Track list. To select multiple tracks, press [Shift] or [Ctrl]/[Command] and click. The Inspector shows the settings for the first selected track (for details, see "The Inspector" on page 17).

3. Click the track name in the Inspector to make sure the topmost section is shown.



4. Pull down the Input Routing pop-up menu and select an input.

The available MIDI inputs are shown. The items on the menu depend on the type of MIDI interface you are using etc.



- If you select the "All MIDI Inputs" option, the track will receive MIDI data from all available MIDI inputs.
- If you hold down [Alt]/[Option] and select a MIDI input, this is selected for all MIDI tracks.
- If you hold down [Shift] and select a MIDI input, this is selected for all selected MIDI tracks.
- If you hold down [Ctrl]/[Command] and select a MIDI input, this is selected for all MIDI tracks within the same folder track (see "Folder tracks" on page 18).

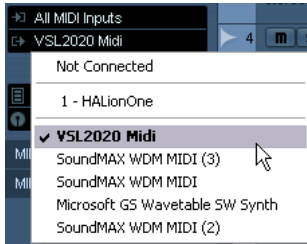
Setting the MIDI channel and output

The MIDI channel and output settings determine where the recorded MIDI is routed during playback, but are also relevant for MIDI Thru in Cubase AI. Channel and output can be selected in the Track list or in the Inspector. The procedure below describes how to make the settings in the Inspector, but it can be done in largely the same manner in the Track list as well.

1. To select the track(s) and show the settings in the Inspector, proceed as when selecting a MIDI input (see above).

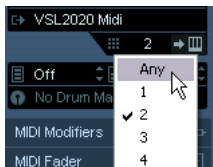
2. Pull down the Output routing pop-up menu and select an output.

The available MIDI outputs are shown. The items on the menu depend on what type of MIDI interface you are using etc.



- If you hold down [Alt]/[Option] and select a MIDI output, this is selected for all MIDI tracks.
- If you hold down [Shift] and select a MIDI output, this is selected for all selected MIDI tracks.
- If you hold down [Ctrl]/[Command] and select a MIDI output, this is selected for all MIDI tracks within the same folder track (see [“Folder tracks”](#) on page 18).

3. Use the channel pop-up menu to select a MIDI channel for the track.

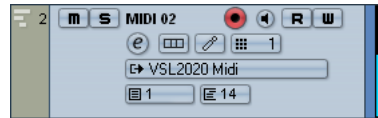
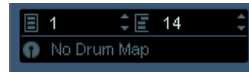


- If you set the track to MIDI channel “Any”, each MIDI event on the track will be sent out on the channel stored in the event itself.

In other words, the MIDI material will be played back on the channel(s) used by the MIDI input device (the MIDI instrument you play during recording).

Selecting a sound

You can select sounds from within Cubase AI by instructing the program to send Program Change and Bank Select messages to your MIDI device. This is done using the “Patch Selector” and “Bank Selector” fields in the Inspector or Track list.



Program Change messages give access to 128 different program locations. If your MIDI instruments have more than 128 programs, Bank Select messages (set in the “Bank Selector” field) allow you to select different banks, each containing 128 programs.

⇒ Bank Select messages are recognized differently by different MIDI instruments. The structure and numbering of banks and programs may also vary. Consult the documentation of your MIDI instruments for details.

Recording

Recording MIDI is done according to the basic recording methods (see [“Basic recording methods”](#) on page 45). When you finish recording, a part containing MIDI events is created in the Project window.

About overlap and the Record Mode setting

MIDI tracks are different from audio tracks when it comes to overlapping parts:

⇒ All events in overlapping parts are always played back. If you record several parts at the same locations (or move parts so that they overlap), you will hear the events in all parts on playback, even though some of the parts are obscured in the Project window.

When recording overlapping parts, the result depends on the Linear Record Mode setting on the Transport panel:

- If Linear Record Mode is set to “Normal”, overdub recording works as with audio tracks, i.e. if you record again where something has already been recorded, you get a new part that overlaps the previous one(s).
- If Linear Record Mode is set to “Merge”, the overdubbed events are added to the existing part.
- If Linear Record Mode is set to “Replace”, the new recording replaces any existing events in the area on that track.

About punch in and out on MIDI tracks

Performing and setting up manual and automatic punch in/out recording for MIDI tracks is done in exactly the same way as for audio tracks. There is one thing to note, however:

- Punching in and out on recordings with Pitch Bend or controller data (modulation wheel, sustain pedal, volume etc.) may lead to strange effects (apparently hanging notes, constant vibrato etc.).

If this happens, you may need to use the Reset item on the MIDI menu (see [“The Reset function”](#) on [page 54](#)).

About the Automatic MIDI Record Quantize function

If Auto Quantize is activated on the Transport panel (the “Auto Q” button), the notes you record are automatically quantized according to the current Quantize settings. For more information about quantizing, see [“The Quantizing functions”](#) on [page 155](#).

Recording MIDI in cycle mode

When you record MIDI in cycle mode, the result depends on which Cycle Record mode is selected on the Transport panel:

Cycle Record mode: Mix (MIDI)

For each completed lap, everything you record is added to what was previously recorded in the same part. This is useful for building up rhythm patterns, for example. Record a hi-hat part on the first lap, the bass drum part on the second lap etc.

Cycle Record mode: Overwrite (MIDI)

As soon as you play a MIDI note (or send any MIDI message), all MIDI you have recorded on previous laps is overwritten from that point on in the part. An example:

1. You start recording in an eight bar cycle.
2. The first take wasn't good enough – you start directly with a new take on the next cycle lap and overwrite the first take.
3. After recording the second take you let the recording roll on and listen, without playing anything. You find that the take was good up until bar seven, for example.
4. On the next lap, wait until bar seven, then start playing. This way you will overwrite the last two bars only.

5. Make sure you stop playing before the next lap begins – otherwise you will overwrite the entire take.

Cycle Record mode: Keep Last

Each completed lap replaces the previously recorded lap. Note:

- The cycle lap must be completed – if you deactivate recording or press Stop before the cursor reaches the right locator, the previous take will be kept.
- If you don't play or input any MIDI during a lap, nothing happens (the previous take will be kept).

Recording different types of MIDI messages

⚠ You can decide exactly which event types should be recorded by using the MIDI filters – see [“Filtering MIDI”](#) on [page 55](#).

Notes

When you press and release a key on your synth or other MIDI keyboard, a Note On (key down) and a Note Off (key up) message are sent out. The MIDI note message also contains the information which MIDI channel was used. Normally, this information is overridden by the MIDI channel setting for the track, but if you set the track to MIDI channel “Any”, the notes will be played back on their original channels.

Continuous messages

Pitch bend, aftertouch and controllers (like modulation wheel, sustain pedal, volume etc.) are considered as MIDI continuous events (as opposed to the momentary key down and key up messages). If you move the Pitch bend wheel on your synthesizer while recording, this movement is recorded together with the key (Note On and Note Off messages), just as you'd expect. But the continuous messages can also be recorded after the notes have been recorded (or even before). They can also be recorded on their own tracks, separately from the notes to which they belong.

Say, for instance, that you record one or several bass parts on track 2. If you now set another track, like track 55, to the same output and MIDI channel as track 2, you can make a separate recording of just pitch bends for the bass parts on track 55. This means that you activate recording

as usual and only move the pitch bend wheel during the take. As long as the two tracks are set to the same output and MIDI channel, it will appear to the MIDI instrument as if the two recordings were made at the same time.

Program Change messages

Normally, when you switch from one program to another on your keyboard (or whatever you use to record), a number corresponding to that program is sent out via MIDI as a Program Change message. These can be recorded on the fly with the music, recorded afterwards on a separate track, or manually entered in the Key or List Editors.

System Exclusive messages

System Exclusive (SysEx) is a special type of MIDI message used to send data that only makes sense to a unit of a certain make and type. SysEx can be used to transmit a list of the numbers that make up the settings of one or more sounds in a synth. For more about viewing and editing SysEx messages, see the chapter [“Working with System Exclusive messages”](#) on [page 201](#).

The Reset function

The Reset function on the MIDI menu sends out note-off messages and resets controllers on all MIDI channels. This is sometimes necessary if you experience hanging notes, constant vibrato, etc.

- Cubase AI can also automatically perform a MIDI reset on stop.

You can turn this function on or off in the Preferences (MIDI page).

- Also in the Preferences (MIDI page), you can find the option “Insert Reset Events after Record”.

This is a very handy function for MIDI recording. At the end of each recorded part, a Reset event will be inserted, resetting controller data such as Sustain, Aftertouch, Pitchbend, Modulation, Breath Control, etc. This is useful if a MIDI part is recorded and e.g. the Sustain pedal is still held after stopping recording. Usually, this would cause all following parts to be played with Sustain, as the Pedal Off command was not recorded. This can be prevented by activating “Insert Reset Events after Record”.

Retrospective Record

This feature allows you to capture any MIDI notes you play in Stop mode or during playback and turn them into a MIDI part “after the fact”. This is possible due to the fact that Cubase AI can capture MIDI input in buffer memory, even when not recording.

Proceed as follows:

1. Enable the Retrospective Record function in the Preferences (Record page).

This activates the buffering of MIDI input, making Retrospective Record possible.

2. Make sure a MIDI track is record-enabled.

3. When you have played some MIDI material you want to capture (either in Stop mode or during playback), select Retrospective Record from the Transport menu (or use the key command, by default [Shift]+[Pad*]).

The content of the MIDI buffer (i.e. what you just played) is turned into a MIDI part on the record enabled track. The part will appear where the project cursor was when you started playing – this means that if you played along during playback, the captured notes will end up exactly where you played them in relation to the project.

- The Retrospective Record Buffer Size setting in the Preferences (Record page) determines how much data can be captured.

MIDI Preferences

There are several other options and settings in the Preferences that affect MIDI recording and playback:

MIDI page

- Length Adjustment

Adjusts the length of notes so that there is always a short time between the end of one note and the start of another (of the same pitch and on the same MIDI channel). The time is set in ticks. By default there are 120 ticks per 1/16 note.

Record page

- Snap MIDI Parts to Bars

When this is activated, recorded MIDI parts will automatically be lengthened to start and end at whole bar positions. If you are working in a Bars+Beats-based context, this can make editing (moving, duplicating, repeating, etc.) easier.

- Solo Record in MIDI Editors

If this is activated and you open a part for editing in a MIDI editor, its track is automatically record-enabled. Furthermore, Record Enable is deactivated for all other MIDI tracks until you close the editor again.

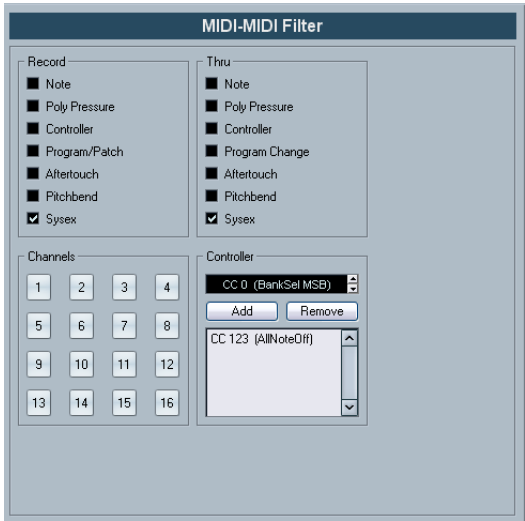
This makes it easier to record MIDI data when you're editing a part – you will always be sure the recorded data ends up in the edited part and not on any other track.

▪ MIDI Record Catch Range in ms

When you record starting at the left locator, this setting helps you make sure the very start of the recording is included. A very annoying scenario is when you have recorded a perfect MIDI take, only to find out that the very first note wasn't included – because you started playing a little bit too early! If you raise the Record Catch Range, Cubase AI will catch the events played just before the recording start point, eliminating this problem.

For a description of the other options, click the Help button in the Preferences.

Filtering MIDI



The MIDI–MIDI Filter page in the Preferences allows you to prevent certain MIDI messages from being recorded and/or “thruput” (echoed by the MIDI Thru function).

The dialog is divided into four sections:

Section	Description
Record	Activating any of these options prevents that type of MIDI message from being recorded. It will, however, be thru-put, and if already recorded, it will play back normally.
Thru	Activating any of these options prevents that type of MIDI message from being thru-put. It will, however, be recorded and played back normally.

Section	Description
Channels	If you activate a channel button, no MIDI messages on that MIDI channel will be recorded or thru-put. Already re-corded messages will, however, be played back normally.
Controller	Allows you to prevent certain MIDI controller types from being recorded or thru-put. To filter out a controller type, select it from the list at the top of the Controller section and click “Add”. It will ap-pear on the list below. To remove a controller type from the list (allow it to be re-corded and thru-put), select it in the lower list and click “Remove”.

Options and Settings

Recording-related Transport Preferences

A couple of settings in the Preferences (Transport page) are relevant for recording. Set these according to your preferred method of work:

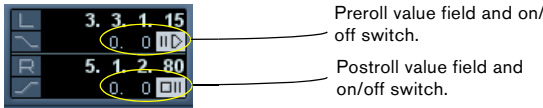
Deactivate Punch In on Stop

If this is activated, punch in on the Transport panel is auto-matically deactivated whenever you enter Stop mode.

Stop after Automatic Punch Out

If this is activated, playback will automatically stop after automatic punch out (when the project cursor reaches the right locator and punch out is activated on the Transport panel). If the postroll value on the Transport panel is set to a value other than zero, playback will continue for the set time before stopping (see below).

About Preroll and Postroll



The preroll and postroll value fields (below the left/right locator fields) on the Transport panel have the following functionality:

- By setting a preroll value, you instruct Cubase AI to “roll back” a short section whenever playback is activated. This applies whenever you start playback, but is perhaps most relevant when recording from the left locator (punch in activated on the Transport panel) as described below.

- By setting a postroll value, you instruct Cubase AI to play back a short section after automatic punch out before stopping.

This is only relevant when punch out is activated on the Transport panel and “Stop after Automatic Punch Out” is activated in the Preferences (Transport page).

- To turn preroll or postroll on or off, click the corresponding button on the Transport panel (next to the pre/postroll value) or use the “Use Preroll” and “Use Postroll” options on the Transport menu.

An example:

1. Set the locators to where you want to start and end recording.
2. Activate Punch in and Punch out on the Transport panel.
3. Activate the option “Stop after Automatic Punch Out” in the Preferences (Transport page).
4. Set suitable preroll and postroll times by clicking in the corresponding fields on the Transport panel and typing in time values.
5. Activate preroll and postroll by clicking the buttons next to the preroll and postroll times so that they light up.
6. Activate recording.

The project cursor “rolls back” by the time specified in the preroll field and playback starts. When the cursor reaches the left locator, recording is automatically activated. When the cursor reaches the right locator, recording is deactivated, but playback continues for the time set in the postroll field before stopping.

Using the metronome

The metronome can output a click that can be used as a timing reference. The two parameters that govern the timing of the metronome are tempo and time signature, and these are edited in the Tempo Track window (see [“Editing the tempo curve”](#) on [page 208](#)).

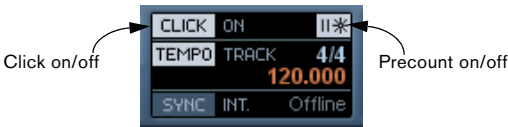
You can use the metronome for a click during recording and/or playback or for a precount (count-in) that will be heard when you start recording from Stop mode. Click and precount are activated separately:

- To activate the metronome, click the Click button on the Transport panel.

You can also activate the “Metronome On” option on the Transport menu or use the corresponding key command (by default [C]).

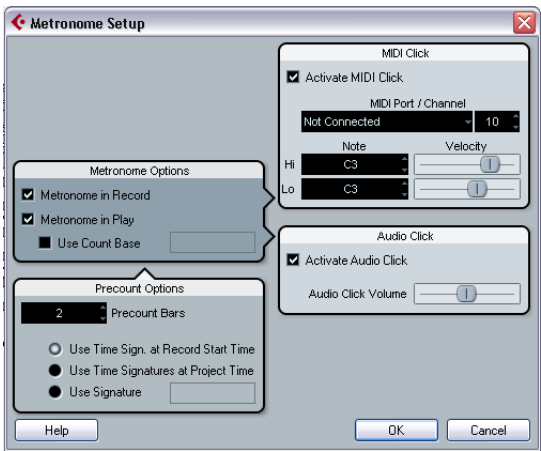
- To activate the precount, click the Precount button on the Transport panel.

You can also activate the “Precount On” option on the Transport menu or set up a key command for this.



Metronome settings

You make settings for the metronome in the Metronome Setup dialog, opened from the Transport menu.



The metronome can use either an audio click played back via the audio hardware, send MIDI data to a connected device which will play back the click or do both.

The following metronome settings are available in the dialog:

Metronome Options	Description
Metronome in Record / Play	Allows you to specify whether the metronome should be heard during playback, recording or both (when Click is activated on the Transport panel).
Use Count Base	If this option is activated, a field appears to the right where you specify the “rhythm” of the metronome. Normally, the metronome plays one click per beat, but setting this to e.g. “1/8” gives you eighth notes – two clicks per beat. It’s also possible to create unusual metronome rhythms such as triplets etc.

Precount Options	Description
Precount Bars	Sets the number of bars the metronome will count in before it starts recording if precount is activated on the Transport panel.
Use Time Signature at Record Start Time	When this is activated, the precount will automatically use the time signature and tempo set at the position where you start recording.
Use Time Signature at Project Time	When this is activated, the precount will be in the time signature set in the Tempo track. Furthermore, any tempo changes in the Tempo track during the precount will be applied.
Use Signature...	This lets you set a time signature for the precount. In this mode, tempo changes in the Tempo track won't affect the precount.

MIDI Click	Description
Activate MIDI Click	Selects whether or not the metronome will sound via MIDI.
MIDI Port/Channel	This is where you select a MIDI output and channel for the metronome click.
Hi Note/Velocity	Sets the MIDI note number and velocity value for the "high note" (the first beat in a bar).
Lo Note/Velocity	Sets the MIDI note number and velocity for the "low notes" (the other beats).


Audio Click	Description
Activate Audio Click	Selects whether or not the metronome will sound via the audio hardware. Use the Audio Click Volume slider to set the level of the click.


Recovery of audio recordings after system failure

Normally, when a computer crashes, all changes made to your current project since you last saved it will be lost. Usually, there is no quick and easy way to recover your work.

With Cubase AI, when your system crashes while you are recording (because of a power cut or other mishap), you will find that your recording is still available, from the moment when you started recording to the time when your computer crashed.

When you experience a computer crash during a recording, simply relaunch the system and check the project record folder (by default this is the Audio subfolder inside the project folder). It should contain the audio file you were recording at the time of the crash.

 Please note: This feature does not constitute an "overall" guarantee by Steinberg. While the program itself was improved in such a way that audio recordings can be recovered after a system failure, it is always possible that a computer crash, power cut, etc. might have damaged another component of the computer, making it impossible to save or recover any of the data.

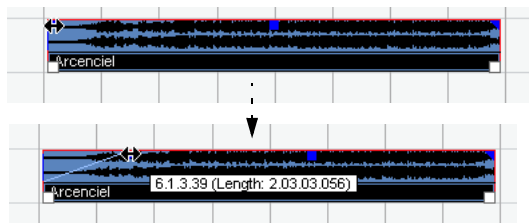
 Warning: Please do not try to actively bring about this kind of situation to test this feature. Although the internal program processes have been improved to cope with such situations, Steinberg cannot guarantee that other parts of the computer are not damaged as a consequence.

Creating fades

There are two main types of fade-ins and fade-outs in audio events in Cubase AI: fades created by using the fade handles (see below) and fades created by processing (see “Fades created by processing” on page 60).

Fades created by using the fade handles

Selected audio events have blue handles in the upper left and right corners. These can be dragged to create a fade-in or fade-out respectively.



Creating a fade-in. The fade is automatically reflected in the shape of the event's waveform, giving you a visual feedback of the result when you drag the fade handle.

Fades created with the handles are not applied to the audio clip as such but calculated in real time during playback. This means that several events referring to the same audio clip can have different fade curves. It also means that having a huge number of fades may demand a lot of processor power.

- If you select multiple events and drag the fade handles on one of them, the same fade will be applied to all selected events.

- A fade can be edited in the Fade dialog, as described on the following pages.

You open the dialog by double-clicking in the area above the fade curve, or by selecting the event and selecting “Open Fade Editor(s)” from the Audio menu (note that this will open two dialogs if the event has both fade-in and fade-out curves).

If you adjust the shape of the fade curve in the Fade dialog, this shape will be maintained when you later adjust the length of a fade.

- You can make the fade longer or shorter at any time, by dragging the handle.

You can actually do this even without selecting the event first, i.e. without visible handles. Just move the mouse pointer along the fade curve until the cursor turns into a bidirectional arrow, then click and drag.

- If the option “Show Event Volume Curves Always” is activated in the Preferences (Event Display–Audio page), the fade curves will be shown in all events, regardless of whether they are selected or not.

If the option is deactivated, the fade curves are shown in selected events only.

Creating and adjusting fades with the Range Selection tool



“Handle-type” fades can also be created and adjusted with the Range Selection tool, in the following way:

1. Select a section of the audio event with the Range Selection tool.

The result depends on your selection, in the following way:

- If you select a range from the beginning of the event, a fade-in will be created within the range.
- If you select a range that reaches the end of an event, a fade-out will be created in the range.
- If you select a range encompassing a middle section of the event, but not reaching neither the start nor the end, both a fade-in and a fade-out will be created outside of the selected range. In other words, the fade-in will cover the area from the beginning of the event to the beginning of the selected range, and the fade-out will cover the area from the end of the selected range to the end of the event.

2. Pull down the Audio menu and select “Adjust Fades to Range”.

The fade areas are adjusted according to the selection range.

⚠ You can select multiple audio events on separate tracks with the Range Selection tool, and apply the fade to all of them simultaneously.

About the volume handle

A selected audio event also has a blue handle in the top middle. This is the volume handle, and it provides a quick way of changing the volume of an event, directly in the Project window. It stands in direct correlation with the volume setting on the info line, that is, dragging the volume handle also changes the value on the info line.

The volume change is displayed numerically on the info line.

Drag the Volume handle up or down to change the volume of the event.



The event waveform reflects the volume change.

Removing fades

To remove the fades for an event, select the event and select "Remove Fades" from the Audio menu.

You can also use the Range Selection tool to remove fades and crossfades within the selected range:

1. Drag the Range Selection tool in the Project window, so that the selection encloses all of the fades and crossfades you wish to remove.
2. Select "Remove Fades" from the Audio menu.

Fades created by processing

If you have selected an audio event or a section of an audio event (using the Range Selection tool), you can apply a fade-in or fade-out to the selection by using the "Fade In" or "Fade Out" functions on the Process submenu on the Audio menu. These functions open the corresponding Fade dialog, allowing you to specify a fade curve.

- ⚠ Note that the length of the fade area is determined by your selection. In other words, you specify the length of the fade before you enter the Fade dialog.
- ⚠ Also note that you can select multiple events and apply the same processing to all of them simultaneously.

Fades created this way are applied to the audio clip rather than to the event. Please note the following:

- If you later create new events that refer to the same clip, these will have the same fades.

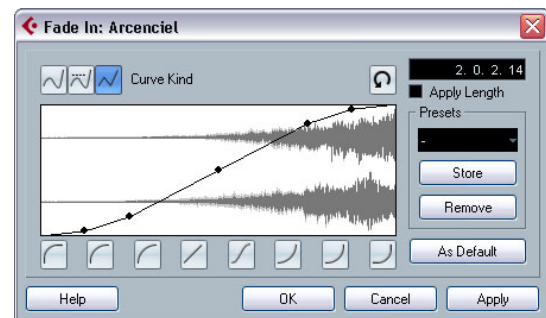
If other events refer to the same audio clip, you will be asked whether you want the processing to be applied to these events or not.

- Continue will apply the processing to all events that refer to the audio clip.
- New Version will create a separate, new version of the audio clip for the selected event.
- You can also activate "Do not show this message again". Regardless of whether you then choose "Continue" or "New Version", any further processing will conform to the option you select.

- ⚠ You can change this setting at any time in the Preferences (Editing-Audio page), under "On Processing Shared Clips".

The Fade dialogs

The Fade dialogs appear when you edit an existing fade or use the "Fade In"/"Fade Out" functions on the Process submenu on the Audio menu. The picture below shows the Fade In dialog; the Fade Out dialog has identical settings and features.



- If you open the Fade dialog(s) with several events selected, you can adjust the fade curves for all these events at the same time.

This is useful if you want to apply the same type of fade-in to more than one event, etc.

Curve Kind

These determine whether the fade curve should consist of spline curve segments (left button), damped spline segments (middle button) or linear segments (right button).

Fade display

Shows the shape of the fade curve. The resulting waveform shape is shown in dark grey, with the current waveform shape in light grey.

You can click on the curve to add points, and click and drag existing points to change the shape. To remove a point from the curve, drag it outside the display.

Curve shape buttons

These buttons give you quick access to some common curve shapes.

Restore button



The Restore button (to the right above the fade display) is only available when editing fades made by dragging the fade handles. Click this to cancel any changes you have made since opening the dialog.

As Default button

The “As Default” button is only available when editing fades made by dragging the fade handles. Click this to store the current settings as the default fade. This shape will be used whenever you create new fades.

Fade Length Value

The Fade Length Value can be used to enter fade lengths numerically. The format of values displayed here are determined by the Time Display in the Transport Panel.

When you activate the “Apply Length” option, the value entered in the Fade Length value field will be used when clicking “Apply” or “OK.” This setting is deactivated by default.

When you set the current Fade as the Default fade, the length value is included as part of the default settings.

Presets

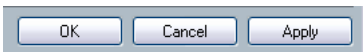
If you have set up a fade-in or fade-out curve that you may want to apply to other events or clips, you can store it as a preset by clicking the Store button.

- To apply a stored preset, select it from the pop-up menu.
- To rename the selected preset, double-click on the name and type a new one.
- To remove a stored preset, select it from the pop-up menu and click Remove.

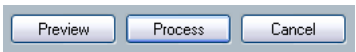
⚠ Stored fade-in presets will only appear in the Fade In dialog, and fade-out presets will only appear in the Fade Out dialog.

Preview, Apply and Process

The buttons in the bottom row are different depending on whether you are editing a fade made with the fade handles or applying a fade using processing:



The Edit Fade dialog.



The Process Fade dialog.

The Edit Fade dialogs have the following buttons:

Button	Function
OK	Applies the set fade curve to the event, and closes the dialog.
Cancel	Closes the dialog.
Apply	Applies the set fade curve to the event, without closing the dialog.

The Process Fade dialogs have the following buttons:

Button	Function
Preview	Plays back the fade area. Playback will repeat until you click the button again (the button is labeled “Stop” during playback).
Process	Applies the set fade curve to the clip, and closes the dialog.
Cancel	Closes the dialog without applying any fade.

Creating crossfades

Overlapping audio material on the same track can be crossfaded, for smooth transitions or special effects. You create a crossfade by selecting two consecutive audio events and selecting the Crossfade command on the Audio menu (or by using the corresponding key command, by default [X]). The result depends on whether the two events overlap or not:

- If the events overlap, a crossfade is created in the overlapping area.

The crossfade will be of the default shape – initially a linear, symmetric crossfade, but you can change this as described below.



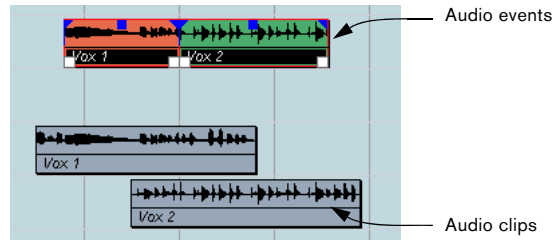
Overlapping section



- If the events don't overlap but are directly consecutive (lined up end-to-start, with no gap), it's still possible to crossfade them – provided that their respective audio clips overlap! In this case, the two events are resized so that they overlap, and a crossfade of the default length and shape is applied.

The default crossfade length and shape are set in the Crossfade dialog (see “Default buttons” on [page 64](#)).

An example:



The events in themselves do not overlap, but their clips do. Therefore, the events can be resized so that they overlap, which is required for a crossfade to be created.



When you select the Crossfade function, the two events are resized so that they overlap, and a default crossfade is created in the overlapping section.

- If the events don't overlap, and cannot be resized enough to overlap, a crossfade cannot be created.
- Once you have created a crossfade, you can edit it by selecting one or both crossfaded events, and selecting “Crossfade” from the Audio menu again (or by double-clicking in the crossfade zone).

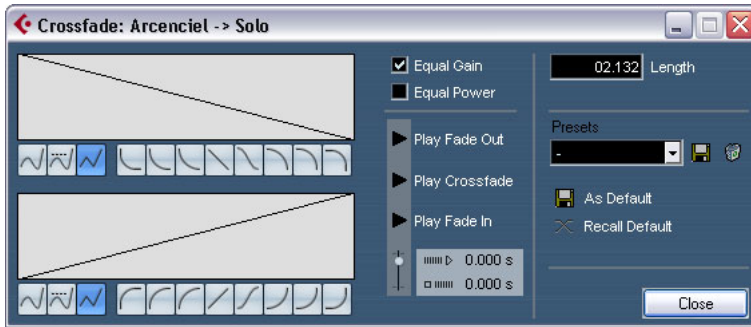
This opens the Crossfade dialog, see below.

Removing crossfades

To remove a crossfade, select the events and select “Remove Fades” from the Audio menu, or use the Range Selection tool:

1. Drag the Range Selection tool in the Project window, so that the selection encloses all of the fades and crossfades you wish to remove.
 2. Select “Remove Fades” from the Audio menu.
- You can also remove a crossfade by clicking and dragging it outside the track.

The Crossfade dialog



The Crossfade dialog contains separate, but identical, sections for the fade-in and fade-out curve settings in the crossfade on the left, and common settings on the right.

Fade Displays

Shows the shape of the fade-out and fade-in curve, respectively. You can click on the curve to add points, and click and drag existing points to change the shape. To remove a point from the curve, drag it outside the display.

Curve kind buttons

These buttons determine whether the corresponding fade curve should consist of spline curve segments (left button), damped spline segments (middle button) or linear segments (right button).

Curve shape buttons

These buttons give you quick access to some common curve shapes.

Equal Power and Gain

- If you activate the “Equal Gain” checkbox, the fade curves are adjusted so that the summed fade-in and fade-out amplitudes will be the same all along the crossfade region. This is often suitable for short crossfades.

- If you activate the “Equal Power” checkbox, the fade curves are adjusted, so that the energy (power) of the crossfade will be constant all along the crossfade region.

⚠ Equal Power curves have only one editable curve point. You cannot use the Curve kind buttons or the presets when this mode is selected.

Play buttons

- The “Play Fade Out” and “Play Fade In” buttons allow you to audition the fade-out or fade-in part only, without the crossfade.
- The “Play Crossfade” button plays back the whole crossfade.

You can also use the Transport play controls to play back the crossfaded audio events. However, that method will play back all unmuted audio events on other tracks as well.

Pre-roll and Post-roll

When auditioning with the Play buttons, you can choose to activate pre-roll and/or post-roll. Pre-roll lets you start playback before the fade area, and post-roll lets you stop playback after the fade area. This can be useful for auditioning the fade in a context.

- To specify how long the pre- and post-rolls should be, click in the time fields and enter the desired time (in seconds and milliseconds).
- To activate pre- and post-roll, click the respective button. To deactivate, click the button again.

Length settings

You can adjust the length of the crossfade area numerically in the “Length” field. If possible, the length change will be applied equally to “both sides” of the crossfade (i.e. Cubase AI tries to “center” the crossfade).

⚠ To be able to resize a crossfade this way, it must be possible to resize the corresponding event. For example, if the left crossfaded event already plays its audio clip to the end, its endpoint cannot be moved any further to the right.

Presets

If you have set up a crossfade shape that you may want to apply to other events, you can store it as a preset by clicking the Store button.

- To apply a stored preset, select it from the pop-up menu.
- To rename the selected preset, double-click on the name and type in a new one.
- To remove a stored preset, select it from the pop-up menu and click Remove.

Default buttons

- Clicking the “As Default” button stores all of the current settings as the default crossfade. These settings will then be used whenever you create new crossfades.
- The Crossfade Length setting is included in the Default settings. However, it is only applied if the events to be crossfaded don’t overlap – otherwise the crossfade will be in the overlap area (see [“Creating crossfades”](#) on [page 62](#)).
- Clicking the “Recall Default” button copies the curves and settings of the Default crossfade to the Crossfade dialog.

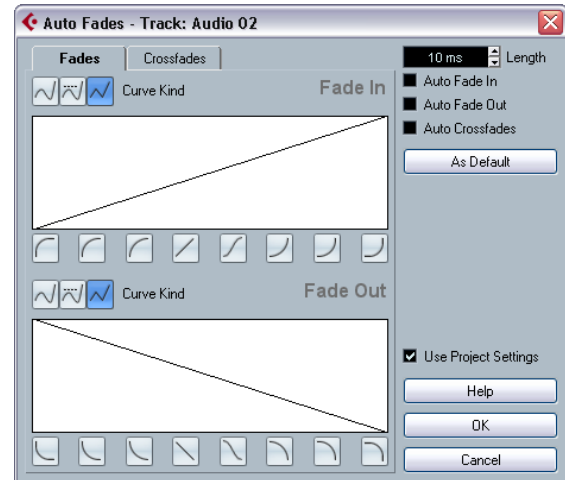
Auto Fades and Crossfades

Cubase AI features an Auto Fade function that can be set both globally, i.e. for the entire project, and separately for each audio track. The idea behind the Auto Fade function is to create smoother transitions between events by applying short (1–500 ms) fade-ins and fade-outs.

⚠ As mentioned earlier, fades are calculated in real time during playback. This means that the larger the number of audio tracks with Auto Fades activated in a project, the higher the demands on the processor.

Making global Auto Fade settings

1. To make Auto Fades settings globally for the project, select “Auto Fades Settings...” from the Project menu. This opens the Auto Fades dialog for the project.



2. Use the checkboxes in the upper right corner to activate or deactivate Auto Fade In, Auto Fade Out and Auto Crossfades, respectively.
3. Use the Length value field to specify the length of the Auto Fade or Crossfade (1-500 ms).
4. To adjust the shapes of Auto Fade In and Auto Fade Out, select the “Fades” tab and make settings as in the regular Fade dialogs.
5. To adjust the shape of the Auto Crossfade, select the “Crossfades” tab and make settings as in the regular Crossfade dialog.

6. If you want to use the settings you have made in future projects, click the “As Default” button.

The next time you create a new project, it will use these settings by default.

7. Click OK to close the dialog.

Making Auto Fade settings for a separate track

By default, all audio tracks will use the settings you have made in the project’s Auto Fades dialog. However, since Auto Fades use computing power, a better approach may be to turn Auto Fades off globally and activate them for individual tracks, as needed:

1. Right-click the track in the Track list and select “Auto Fades Settings...” from the context menu (or select the track and click the “Auto Fades Settings” button in the Inspector).

The Auto Fades dialog for the track opens. This is identical to the project’s Auto Fades dialog, with the addition of a “Use Project Settings” option.

2. Deactivate the “Use Project Settings” option.

Now, any settings you make will be applied to the track only.

3. Set up the Auto Fades as desired and close the dialog.

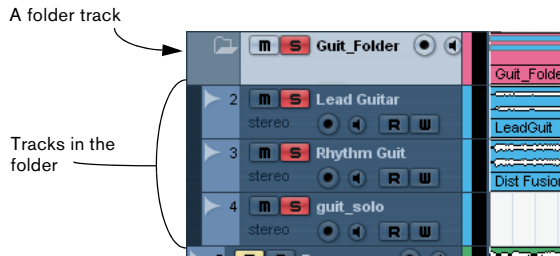
Reverting to project settings

If you want a track to use the global Auto Fade settings, open the Auto Fades dialog for the track and activate the “Use Project Settings” checkbox.

7

Folder tracks

About folder tracks



Just as the name implies, a folder track is a folder that contains other tracks. Moving tracks into a folder is a way to structure and organize tracks in the Project window. For example, grouping several tracks in a folder track makes it possible for you to “hide” tracks (thus giving you more working space on the screen). You can solo and mute several tracks in a quicker and easier way and perform editing on several tracks as one entity. Folder tracks can contain any type of track including other folder tracks.

Handling folder tracks

Creating a folder track

Folder tracks are created just like any other track: Select “Add Track” from the Project menu and select “Folder” from the submenu that appears, or right-click in the Track list and select “Add Folder Track” from the context menu.

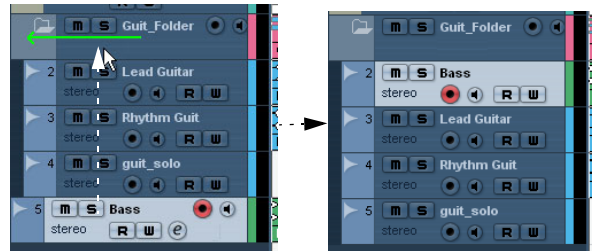
Moving tracks into a folder

You can move any type of track into a folder by using drag and drop:

1. In the Track list, click on a track that you want to move into a folder and drag it onto a folder track. A green arrow pointing to a folder appears when you drag the track onto the folder track in the list.

2. Release the mouse button.

The track is now placed in the folder track, and all parts and events on the track will be represented by a corresponding folder part (see “Working with folder parts” on page 68), which is a graphical representation of all parts and events in the folder.



Since you can move any type of track into a folder track, it is possible to create sub-folders by moving one folder track into another. This is called “nesting”. For example, you could have a folder containing all the vocals in a project, and each vocal part could have a nested folder containing all the takes for easier handling etc.

Removing tracks from a folder

To remove a track from a folder, simply drag it out of the folder and release it in the Track list.

Hiding/showing tracks in a folder

You can hide or show the tracks located in a folder by clicking on the “Expand/Collapse Folder” button (the folder icon). Hidden tracks are still played back as usual.



When a folder is “closed” this way, the folder part(s) still give you a graphic representation of the parts and events within the folder.

Muting and soloing folder tracks

One of the main advantages of using folder tracks is that they provide you with a way to mute and solo several tracks as one unit. Muting and soloing a folder track affects all tracks in the folder. You can also solo or mute individual tracks in the folder.

Muting a folder track

You can mute a folder track (and thereby mute all tracks within it) the same way you mute other tracks by clicking in the Mute (“M”) button in the Track list.

Soloing a folder track

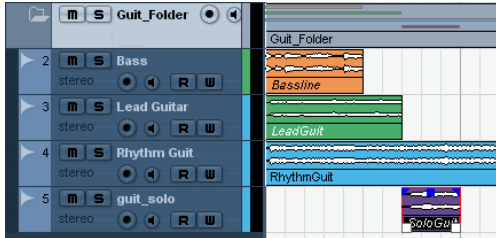
You can solo a folder track (and thereby mute all tracks outside the folder, except those already set to Solo) the same way you solo other tracks, by selecting it and clicking the Solo button.

Soloing or muting tracks within a folder

This can be done by showing the tracks in the folder and using the Mute and Solo buttons in the Track list as usual for any tracks inside the folder.

Working with folder parts

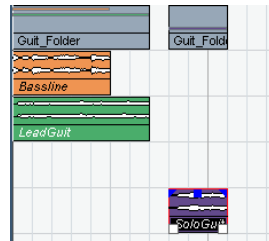
A folder part is a graphic representation of events and parts on the tracks in the folder. Folder parts indicate the position and length of the events and parts, as well as on which track they are (their vertical position). If part colors are used, these are also shown in the folder part.



Folder parts are created automatically when there are parts or events on the tracks within the folder. The following rules apply:

- If there is a gap between parts/events on the tracks, there will be two separate folder parts.

- Parts or events that overlap within the folder may be represented by the same folder part or by two different folder parts – depending on how much they overlap. If a part/event overlaps by half its length or less, it will be placed in a new folder part.



The “LeadGuit” event overlaps the “Bassline” event by more than half its length, which means it is included in the same folder part.

The “SoloGuit” event does not overlap with any of the other events. This means a new folder part is created.

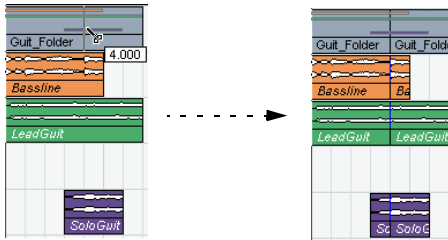
Handling and editing folder parts

Most of the editing you can do in the Project window applies to folder parts as well.

Any Project window editing you perform to a folder part affects all the events and parts it contains (those elements on the track within the folder that are represented by the folder part). You can select several folder parts if you like – this allows you to handle and edit them together. The editing you can perform includes:

- Moving a folder part. This will move its contained events and parts (possibly resulting in other folder parts, depending on how the parts overlap).
- Using cut, copy and paste.
- Deleting a folder part. This will delete its contained events and parts.
- Splitting a folder part with the Scissors tool (see the example below).
- Gluing folder parts together with the Glue tube tool. This will only work if the adjacent folder parts contain events or parts on the same track.
- Resizing a folder part resizes the contained events and parts according to the selected resizing method. This is set by clicking the Arrow tool icon on the toolbar and selecting “Normal Sizing”, “Sizing Moves Contents” or “Sizing Applies Time Stretch” from the pop-up menu – see [“Resizing events” on page 31](#). Note that if you select “Sizing Applies Time Stretch”, any automation data is not taken into account.
- Muting a folder part. This will mute its contained events and parts.

An example



Splitting the folder part
with the Scissors tool...



...will split all contained parts or
events present at that position.

Editing tracks within folder parts

Tracks inside a folder can be edited as one entity by performing the editing directly on the folder part containing the tracks as explained above. You can also edit individual tracks within the folder by showing the contained tracks, selecting parts and opening editors as usual.

Double-clicking a folder part opens the editors for the corresponding track classes present in the folder. The following applies:

- All MIDI parts located on the tracks within the folder are displayed as if they were on the same track, just like when opening the Key Editor with several MIDI parts selected. To be able to easily discern the different tracks in the editor, give each track a different color in the Project window and use the "Part Colors" option in the editor (see ["Coloring notes and events"](#) on [page 171](#)).
- If the folder contains tracks with audio events and/or audio parts, the Sample and/or Audio Part Editors are opened with each audio event and audio part in a separate window.

About markers

Markers are used to quickly locate certain positions. If you often find yourself jumping to a specific position within a project, you should insert a marker at this position. There are two types of markers:

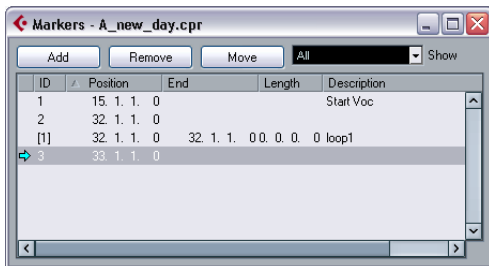
- Cycle markers that allow you to store the start and end positions of a range.
- Standard markers that store a specific position.

Markers can be created and edited in several ways:

- By using the Marker window (see below).
- By using the Marker track (see [“Using the Marker track”](#) on [page 72](#)).
- By using key commands (see [“Marker key commands”](#) on [page 74](#)).

⇒ The left and right locators are handled separately – see [“The left and right locators”](#) on [page 42](#).

The Marker window



In the Marker window, you can perform most editing operations concerning markers. The markers are listed in the Marker window in the order in which they occur in the project. Most functions in the Marker window are also available in the Inspector when the Marker track is selected.

To open the Marker window, you can:

- Select “Markers” from the Project menu
- Click the “Show” button in the Marker section on the Transport panel
- Use the key command (by default [Ctrl]/[Command]-[M]).

The Marker window columns

The Marker window is divided into six columns which are used for performing the following operations:

- The leftmost column is the Locate column. Clicking in this column will move the project cursor to the corresponding marker position. A blue arrow indicates the marker at the project cursor position (or the closest marker before the project cursor).

- The ID column is used to edit marker ID numbers. See [“About marker ID numbers”](#) on [page 72](#).

- The Position column displays the markers' time positions (or start positions for cycle markers). The marker positions can be edited directly in this column.

- The End and Length columns display the end positions and length of cycle markers – see [“About cycle markers”](#) on [page 72](#). These values can also be edited directly in the respective column.

- The Description column lets you enter names or descriptions for markers.

Click on a column heading to sort the marker list by that column. The Marker columns can also be reordered by dragging and dropping the column headers.

Adding and removing markers in the Marker window

- You add position markers (in Stop mode, during playback or during recording) by clicking the Add button or by pressing [Insert] (Windows only) on the computer keyboard. Markers are always added at the current project cursor position.

- To add a cycle marker, select “Cycle Markers” from the Show pop-up menu and click the Add button. This adds a cycle marker between the left and right locator. You can also draw cycle markers on the Marker track (see [“Editing markers on the Marker track”](#) on [page 73](#)).

- To remove a marker, select it and click the Remove button.

⇒ Note that you can assign key commands to various marker commands in the Key Commands dialog (see [“Marker key commands”](#) on [page 74](#)).

Moving marker positions in the Marker window

The Move button in the Marker window can be used to “reprogram” marker positions. Proceed as follows:

1. Set the project cursor to the position to which you want to move (or re-program) a marker.
2. Select the marker that you want to change in the Marker window.
Do not select the marker by clicking in the leftmost column, as this will move the project cursor to this marker.
 - If a cycle marker is selected, the Move operation affects the cycle marker start position.
The length of the range is not affected.
3. Click the Move button.

You can also move markers by editing their position numerically in the Position column.

About marker ID numbers

Each time you add a marker, it is automatically and sequentially assigned an ID number, starting from ID 1. ID numbers can be changed at any time – this allows you to assign specific markers to key commands (see below).

IDs for cycle markers are shown in brackets and start from [1]. These may also be changed.

Assigning markers to key commands

As explained above, marker ID numbers are assigned automatically and sequentially each time you add a marker. The nine first markers (1 to 9) can be recalled by using key commands – by default these are [Shift]+[1] to [9] on the typewriter part of the keyboard.

⇒ If you have more than nine markers, you cannot use key commands to navigate to markers numbered 10 or higher.

If you want to keep all current markers, but want to specify which markers should be accessed via key commands, the solution is to reassign the marker ID numbers. Proceed as follows:

1. First decide which of the current markers with an ID between 1 and 9 you want to reassign to a new ID number, and thus remove its key command assignment.
Memorize the ID number.

2. Enter this ID number in the ID column of the marker you want to access with a key command and press [Enter].

The two marker ID numbers are switched, and the key command now locates to the marker selected in this step.

3. Repeat as necessary for other markers.

- You can also simply remove a marker with an ID number between 1 to 9 to free up a key – see [“Adding and removing markers in the Marker window”](#) on page 71.
- For more about marker key commands, see [“Marker key commands”](#) on page 74.

Using the Marker track



The Marker track is used for viewing and editing markers. Markers shown on the Marker track are exactly the same as shown in the Marker window, and any changes made on the Marker track are reflected in the Marker window and vice versa. Standard position markers in the Marker track are shown as marker events: vertical lines with the marker name (if assigned) and number beside it. If you select the Marker track, all markers are shown in the Inspector, much like in the Marker window.

About cycle markers

Cycle markers are shown on the Marker track as two markers bridged by a horizontal line. Cycle markers are ideal for storing sections of a project. By setting cycle markers for sections of a song, for example “Intro”, “Verse”, “Chorus” etc., this enables you to quickly navigate to the song sections, and also to optionally repeat the section (by activating Cycle on the Transport panel).

In addition, Cycle markers appear on the horizontal Zoom pop-up menu in the Project window (see below).

Adding the Marker track

To add the Marker track to the Project, select “Marker” from the Add Track submenu of the Project menu (or right-click in the Track list and select “Add Marker Track”). You can only have one Marker track in a project.

Editing markers on the Marker track

The following editing functions can be performed directly on the Marker track:

- Adding position markers “on the fly”.
Use the [Insert] key (Win) or the “Add Marker” button in the Track list for the Marker track to add position markers at the current cursor position during playback.



Add Marker/Add Cycle Marker buttons

- Adding a cycle marker at the left and right locator positions.
Clicking the “Add Cycle Marker” button in the Track list for the Marker track adds a cycle marker spanning the area between the left and right locator.

- Selecting markers.
You can use standard selection techniques like dragging to make a selection rectangle, or use [Shift] to select separate markers.

- Drawing position markers.
By using the Pencil tool (or pressing [Alt]/[Option] and using the Arrow tool), you can create or “draw” position marker events at any position on the track. If snap is activated on the toolbar, this determines at which positions you can draw markers.

- Drawing cycle markers.
To draw a cycle marker range, press [Ctrl]/[Command] and use the Pencil tool or the Arrow tool. Snap settings are applied if activated.



⇒ Cycle markers can freely overlap.

- Resizing a cycle marker.
Select a cycle marker by clicking on it. Two handles appear at the bottom of the start and end events. If you click and hold one of the handles you can drag the event left or right to resize the cycle marker. This can also be done numerically on the info line.



- Moving markers.
Click and drag to move the selected markers or edit marker positions on the info line. As usual, snap is taken into account if activated.

- Removing markers.
This is done exactly the same way as for other events, i.e. by selecting them and pressing [Delete], using the Erase tool etc.
- Naming markers.
A selected marker’s name can be edited on the info line.

Navigating using cycle markers

Cycle markers represent ranges rather than single positions. Therefore you don’t use them for moving the project cursor, but for moving the left and right locators:

- If you double-click on a cycle marker or select it from the Cycle pop-up menu in the Track list, the left and right locators are moved to encompass the cycle marker.
To move the project cursor position to the start or the end of the cycle marker, move it to the corresponding locator (e.g. by using the numeric pad keys [1] and [2]).
- You can also use key commands for this – see “[Marker key commands](#)” on [page 74](#).

Zooming to cycle markers

- By selecting a cycle marker on the Zoom pop-up menu, the event display is zoomed in to encompass the selected range only (see the section “[Zoom presets and Cycle markers](#)” on [page 23](#)).
You can also do this by pressing [Alt]/[Option] and double-clicking on the cycle marker in the event display.

Editing cycle markers using tools

Cycle markers can be edited on the Marker track using the following tools (Snap applies as usual):

Tool	Use
Pencil	Press [Ctrl]/[Command] and use the Pencil tool to create new cycle markers (as described above).
Eraser	Click with the Eraser tool to delete a cycle marker. If you hold down [Alt]/[Option] when you click, all consecutive markers will also be deleted.
Selection Range	This is described in the following section.

The other tools cannot be used with cycle markers.

Using markers to make range selections in the Project window

Besides enabling you to quickly move the project cursor and the locators, markers can be used in conjunction with the Range Selection tool to make range selections in the Project window. This is useful if you quickly want to make a selection that spans all tracks in the project.

- Double-click with the Range Selection tool between any two markers – this creates a selection range between the markers, spanning all tracks in the project (just as if you had used the Range Selection tool to draw a rectangle). Any functions or processing you perform now will affect the selection only.

Moving and copying sections

This is a quick way to move or copy complete sections of the project (on all tracks):

1. Set markers at the start and end of the section you want to move or copy.
 2. Select the Range Selection tool and double-click on the Marker track between the markers.
Everything in the project within the cycle marker boundaries is selected.
 3. Click on the Marker track in the selected range and drag the range to a new position.
The selection in the Project window is moved to the same position.
- If you hold down [Alt]/[Option] while you drag the range, the selection in the Project window is copied instead.

Marker key commands

You can use key commands for the following marker operations:

Operation	Description	Default key
Insert Marker	Creates a new marker at the current project cursor position.	[Insert] (Windows only)
Locate Next Marker	Moves the project cursor to the right to the next marker position (if any).	[Shift]+[N]
Locate Previous Marker	Moves the project cursor to the left to the previous marker position (if any).	[Shift]+[B]
To Marker 1-9	Moves the project cursor to the specified marker (number 1 to 9).	[Shift]+[1] to [9]
Set Marker 1-9	Moves the specified marker (number 1 to 9) to the current project cursor position.	[Ctrl]+[1] to [9]
Recall Cycle Marker 1-9	Moves the left and right locators to encompass the specified cycle marker (1 to 9).	[Shift]+[Pad1] to [Pad9]

If you need to check or change any key command assignments, the marker commands can be found in the Transport category in the Key Commands dialog.

⇒ For the [Shift]+[Pad1] to [Pad9] commands to work, Num Lock must be deactivated on the computer keyboard!

9

The mixer

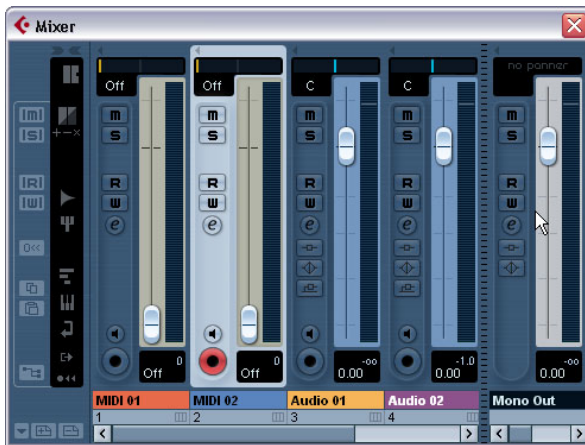
About this chapter

This chapter contains detailed information about the elements used when mixing audio and MIDI, and the various ways you can configure the mixer.

Some mixer related features are not described in this chapter. These are the following:

- Setting up and using audio effects.
See the chapter "Audio effects" in the separate Plug-in Reference manual.
- Automation of all mixer parameters.
See the chapter "Automation" on [page 89](#).
- How to mix down several audio tracks (complete with automation and effects if you wish) to a single audio file.
See the chapter "Export Audio Mixdown" on [page 211](#).

Overview



The mixer offers a common environment for controlling levels, pan, solo/mute status etc. for both audio and MIDI channels.

Opening the mixer

The mixer can be opened in several ways:

- By selecting Mixer from the Devices menu.
- By clicking the Mixer icon on the toolbar



- By using a key command (by default [F3]).
- By clicking the Mixer button in the Devices panel.
You open the Devices panel by selecting Show Panel from the Devices menu.

What channel types can be shown in the mixer?

The following track-based channel types are shown in the mixer:

- Audio
- MIDI
- Effect return channels (referred to as FX channels in the Project window)
- Instrument channels (VSTi Return)
- Group channels
- Instrument tracks

The order of audio, MIDI, instrument, group and effect return channel strips (from left to right) in the mixer corresponds to the Project window Track list (from the top down). If you reorder tracks of these types in the Track list, this will be mirrored in the mixer.

Folder, Marker, Video and Automation tracks are not shown in the mixer.

Output busses in the mixer

Output busses are represented by output channels in the mixer. They appear in a separate "pane" separated by a movable divider and with its own horizontal scrollbar, see "The output channels" on [page 80](#).

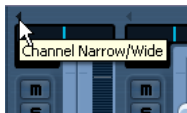
Configuring the mixer

The mixer window can be configured in various ways to suit your needs and to save screen space. Here follows a run through of the various view options (the following descriptions assume that you have an active project containing some tracks):

The mixer shows the channel faders for the various tracks of your project. On the right of the fader panel you find the output channel fader. On the left is the common panel which allows for global settings affecting all channels.

Setting the width of channel strips

- ⚠ Each channel strip can be set to either “Wide” or “Narrow” mode by using the Channel Narrow/Wide button on the left above the fader strip.



The Channel Narrow/Wide button

- Narrow channel strips contain a narrow fader and miniature buttons.



Narrow and wide channel strips

- When selecting “All targets narrow” or “All targets wide” on the common panel, all channel strips selected as command targets (see [“About the Command Target” on page 78](#)) are affected.

Selecting what channel types to show/hide

You can specify what channel types to show or hide in the mixer. In the right part of the common panel you find a vertical strip with different indicator buttons. Each indicator represents a channel type to show or hide in the mixer:



“Command Target” options – see [“About the Command Target” on page 78](#).

“Can Hide” options – see below.

Audio Channels

Group Channels

MIDI Channels

Instrument Channels

Effect Return Channels

Output Channels

Reveals all channel strips

- To hide or show a channel type, click the corresponding indicator.

If an indicator is dark, the corresponding channel type will be shown in the mixer. If it is orange, the corresponding channel type will be hidden.

Showing/hiding individual channels (the “Can Hide” setting)

You can also show/hide individual channels of any type in the mixer. For this, you can assign channels a “Can Hide” status, which allows you to hide these channels collectively. Proceed as follows:

1. [Alt]/[Option]-click the / icon (visible when moving the mouse pointer to the top middle of a channel strip) for the channel you want to hide to activate the “Can Hide” option. If “Can Hide” is activated for a channel strip, the corresponding icon (/) will be visible in the top middle section of the channel strip.



2. Repeat this for all channels you want to hide.

3. Click the top “hide button” (Hide Channels set to “Can Hide”) in the common panel.

This hides all channels set to “Can Hide”. To show them again, click the Hide button again or click the button at the bottom in the common panel (“Reveal All Channels”).

Below the top hide button, there are three additional “Can Hide” buttons.



Option	Description
Set Target Channels to 'Can Hide'	This activates “Can Hide” for all Channels you specified as “Command Targets”. For more information, see “About the Command Target” on page 78 .
Remove 'Can Hide' from Target Channels	This deactivates “Can Hide” for all Channels you specified as “Command Targets”. For more information, see “About the Command Target” on page 78 .
Remove 'Can Hide' from All Channels	This deactivates “Can Hide” for all Channels in the Mixer.

Channel view sets

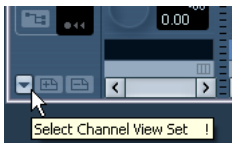
Channel view sets are saved configurations of the mixer windows, allowing you to quickly switch between different layouts for the mixer. Proceed as follows:

1. Set up the mixer the way you wish to store it as a view set.

The following settings will be stored:

- Settings for individual channel strips (e.g. narrow or wide mode and whether the channel strip is (or can be) hidden or not).
- The hide/show status for channel types.

2. Click the “Store View Set” button (the plus sign) at the bottom of the common panel.



3. A dialog appears, allowing you to enter a name for the view set.
4. Click OK to store the current mixer view set.

- You can now return to this stored configuration at any time, by clicking the “Select Channel View Set” button (the down arrow to the left of the “Store View Set” button) and selecting it from the pop-up menu.

- To remove a stored channel view set, select it and click the “Remove View Set” button (the minus sign).

⚠ Some remote control devices (such as Steinberg’s Houston) feature this function, which means that you can use the remote device to switch between the channel view sets.

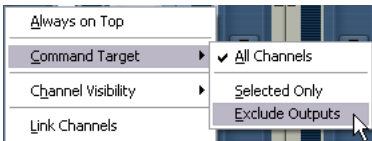
About the Command Target

Command targets let you specify which channels should be affected by the “commands” (basically all the functions that can be assigned key commands) when working with the Mixer, e.g. the width setting of the channel strips, etc. You can set command targets using the Mixer common panel or the context menu.

The Command Target Controls on the common panel



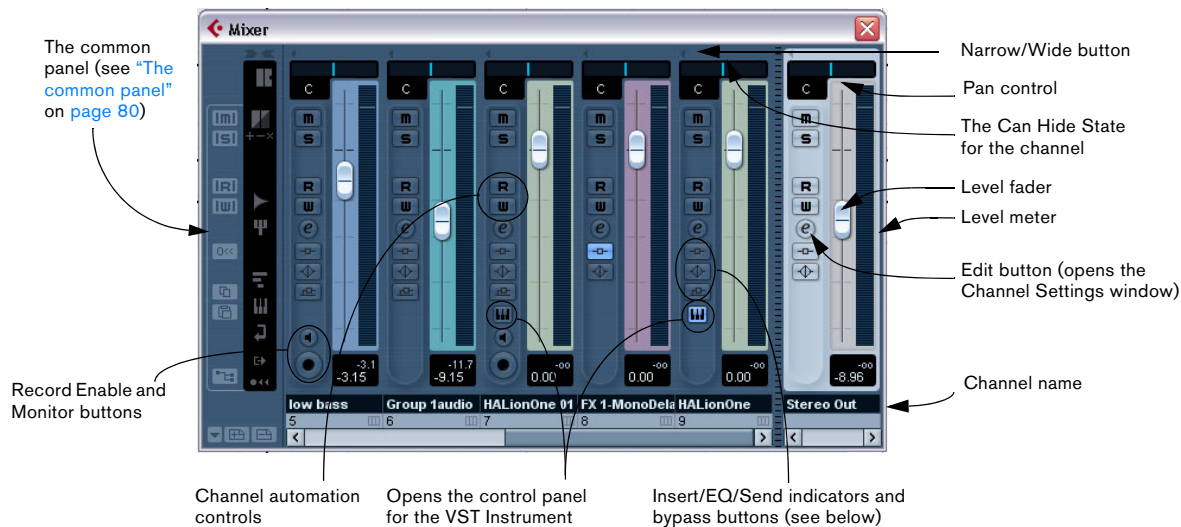
The Command Target submenu in the Mixer context menu



The following options are available:

- **All Channels**
Select this if you want your commands to affect all channels.
- **Selected Only**
Select this if you want your commands to affect the selected channels only.
- **Exclude Outputs**
Select this if you don’t want your commands to affect the output channels.

The audio-related channel strips



The mixer showing (from left to right): the common panel, a stereo audio channel, a group channel, an instrument channel, an effect return channel and a VST Instrument channel strip plus the output channel.

All audio-related channel types (audio, instrument track, output channels, group, effect return, VST Instrument) basically have the same channel strip layout, with the following differences:

- Only audio and instrument track channels have a Monitor and Record Enable button.
- Output channels do not have sends.
- Instrument track and VST Instrument channels have an additional button for opening the instrument's control panel.
- Output channels have clip indicators.

About the Insert/EQ/Send indicators and bypass buttons

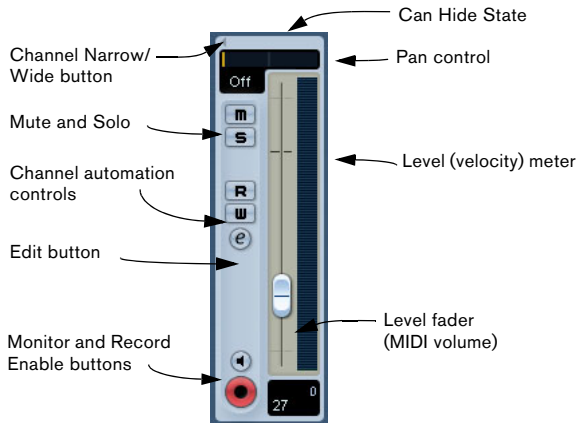


The three indicator buttons in each audio channel strip have the following functionality:

- If an Insert or Send effect or an EQ module is activated for a channel, the corresponding button is lit. The effect indicators will be blue, the EQ indicator will be green.

- If you click these buttons when lit, the corresponding EQ or effects section will be bypassed. Bypass is indicated by yellow buttons. Clicking the button again deactivates bypass.

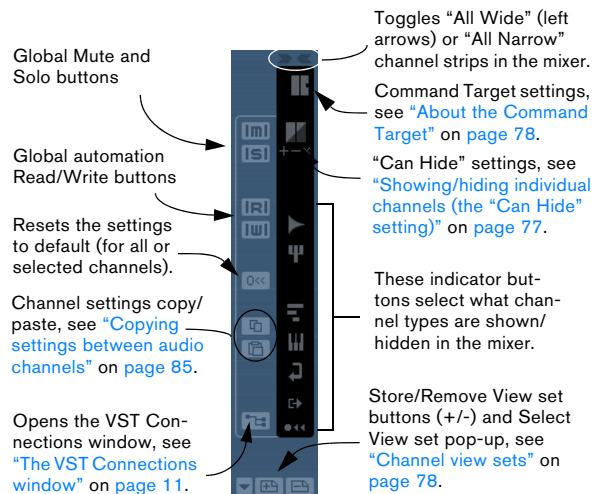
The MIDI channel strips



The MIDI channel strips allow you to control volume and pan in your MIDI instrument (provided that they are set up to receive the corresponding MIDI messages). The settings here are also available in the Inspector for MIDI tracks.

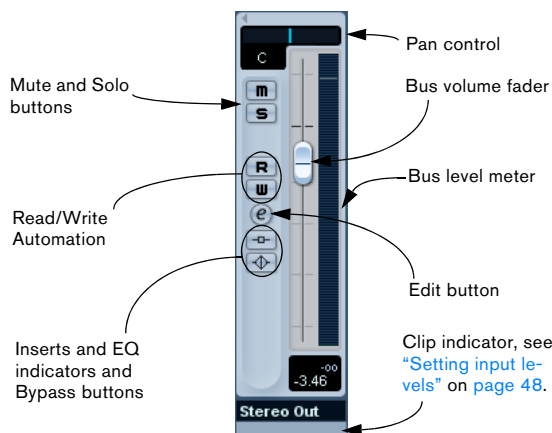
The common panel

The common panel appears to the left in the mixer windows and contains settings for changing the look and behavior of the mixer, as well as global settings for all channels.



The output channels

The output bus you set up in the VST Connections window is represented by an output channel in the mixer. It is shown in a separate "pane" (to the right of the regular channel strips), with its own divider and horizontal scrollbar. The output channel strip is similar to other audio channels.



- For information on how to set up input and output busses, see ["VST Connections: Setting up input and output busses"](#) on page 9.
- How to route audio channels to busses is described in the section ["About output busses"](#) on page 86.
- The Main Mix (the default output) bus is used for monitoring. For information about Monitoring, see ["About monitoring"](#) on page 13.

Basic mixing procedures

Setting volume in the mixer

In the mixer, each channel strip has a fader for volume control.

- For audio channels, the faders control the volume of the channels before they are routed directly or via a group channel to an output bus.
- An output channel fader determines the master output level of all audio channels routed to that output bus.
- MIDI channels handle fader volume changes in the mixer by sending out MIDI volume messages to the connected instrument(s).

Connected instruments must be set to respond to MIDI messages (such as MIDI volume in this case) for this to function properly.

- The fader settings are displayed numerically below the faders, in dB for audio channels and in the MIDI volume 0 to 127 value range for MIDI channels.

You can also click in the fader value fields and type in the volume value.

- To make fine volume adjustments, hold down [Shift] when you move the faders.
- If you hold down [Ctrl]/[Command] and click on a fader, it will be reset to its default value, i.e. 0.0 dB for audio channels, or MIDI volume 100 for MIDI channels. This reset to default values works for most mixer parameters.

You can use the faders to set up a volume balance between the audio and MIDI channels and perform a manual mix by moving the faders and other controls while playing back. By using the Write function (see ["Using Write/Read automation"](#) on page 93), you can automate the levels and most mixer actions.

- ⚠ It is also possible to make static volume settings for an event on the info line or with the volume handle (see ["About the volume handle"](#) on page 60).

About the level meters for audio channels

When playing back audio in Cubase AI, the level meters in the mixer show the level of each audio channel.

- Directly below the level meter is a small level readout – this shows the highest registered peak level in the signal. Click this to reset the peak levels.

If the peak level of the audio goes above 0dB, the numerical level indicator will show a positive value (i.e. a value above 0dB).

Cubase AI uses 32 bit floating point processing internally, so there is virtually limitless headroom – signals can go way beyond 0dB without clipping. Therefore:

⇒ Having higher levels than 0dB for individual audio channels is not a problem in itself. The audio quality will not be degraded by this.

However, when many high level signals are mixed in an output bus, this may require that you lower the output channel level a lot (see below). Therefore it's good practice to keep the max levels for individual audio channels roughly around 0dB.

About the level meters for output channels

For the output channel, things are different. The output channel has a clip indicator.

- When you are recording, clipping can occur when the analog signal is converted to digital in the audio hardware. It's also possible to get clipping in the signal being recorded to disk. For more about checking and setting input levels, see ["Setting input levels"](#) on [page 48](#).

- In the output busses, the floating point audio is converted to the resolution of the audio hardware. In the integer audio domain, the maximum level is 0dB – higher levels will cause the clip indicator for each bus to light up.

If the clip indicators light up for a bus, this indicates actual clipping – digital distortion which should always be avoided.

- ⚠ If the clip indicator lights up for an output channel, reset the clip indicator by clicking on it, and lower the level until the indicator doesn't light up.

About level meters for MIDI channels

The level meters for MIDI channels do not show actual volume levels. Instead, they indicate the velocity values of the notes played back on MIDI tracks.

About MIDI tracks set to the same MIDI channel and output

If you have several MIDI tracks set to the same MIDI channel (and routed to the same MIDI output), making volume and pan settings for one of these MIDI tracks/mixer channels will also affect all other mixer channels set to the same MIDI channel/output combination.

Using Solo and Mute



The Mute (top) and Solo buttons.

You can use the Mute and Solo buttons to silence one or several channels. The following applies:

- The Mute button silences the selected channel.

Clicking the Mute button again un-mutes the channel. Several channels can be muted simultaneously. A muted channel is indicated by a lit Mute button and also by the lit Global Mute indicator on the common panel.



A muted channel in the mixer.



A lit Global Mute indicator on the common panel shows that one or more channels are muted.

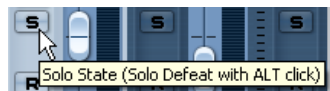
- Clicking the Solo button for a channel mutes all other channels.

A soloed channel is indicated by a lit Solo button, and also by the lit Global Solo indicator on the common panel. Click the Solo button again to turn off Solo.

- Several channels can be soloed at the same time.

- [Alt]/[Option]-clicking a Solo button activates "Solo Defeat" for that channel.

In this mode the channel will not be muted if you solo another channel. To turn off Solo Defeat, [Alt]/[Option]-click the Solo button again.



[Alt]/[Option]-click a Solo button...

...to activate Solo Defeat for that channel.

- You can un-mute or un-solo all channels by clicking the Mute or Solo indicator on the common panel.

Setting pan in the mixer



The pan control.

The pan controls in the mixer are used to position a channel between the left and right side of the stereo spectrum. By default for stereo audio channels, pan controls the balance between the left and right channels. You can change this in the Preferences. By selecting one of the other pan modes (see below), you can set pan independently for the left and right channel.

- To make fine pan adjustments, hold down [Shift] when you move the pan control.
- To select the (default) center pan position, hold down [Ctrl]/[Command] and click on the pan control.
- For MIDI channels, the pan control sends out MIDI pan messages.

The result depends on how your MIDI instrument is set to respond to pan – check your documentation for details.

About the “Stereo Pan Law” Preference (audio channels only)

In the Project Setup dialog there is a pop-up menu named “Stereo Pan Law”, on which you can select one of several pan modes. This is related to the fact that without power compensation, the power of the sum of the left and right side will be higher (louder) if a channel is panned center than if it is panned left or right.

To remedy this, the Stereo Pan Law setting allows you to attenuate signals panned center, by -6, -4.5 or -3dB (default). Selecting the 0dB option effectively turns off constant-power panning. Experiment with the modes to see which fits best in a given situation. You can also select “Equal Power” on this pop-up menu, which means that the power of the signal will remain the same regardless of the pan setting.

Audio specific procedures

This section describes the options and basic procedures regarding audio channels in the mixer.

Using Channel Settings

For each audio channel strip in the mixer and in the Inspector and Track list for each audio track, there is an Edit button (“e”).

Clicking this opens the VST Audio Channel Settings window. By default, this window contains:

- A section with eight insert effect slots (see the chapter “Audio effects” in the separate Plug-in Reference manual).
- Four EQ modules and an associated EQ curve display (see “[Making EQ settings](#)” on [page 83](#)).
- A section with eight effect sends (see the chapter “Audio effects” in the separate Plug-in Reference manual).
- A duplicate of the mixer channel strip (showing the input and output settings).

You can customize the Channel Settings window, by showing/hiding the different panels and/or by changing their order:

- To specify, which panels should be shown/hidden, right-click in the Channel settings window, and activate/deactivate the respective options on the Customize View submenu on the context menu.
- To change the order of the panels, select “Setup” on the Customize View pop-up menu and use the “Move up” and “Move Down” buttons.

For further information, see the chapter “[Customizing](#)” on [page 244](#).

Every channel has its own channel settings (although you can view each in the same window if you like – see below).



Click the Edit button to open the Channel Settings window:



The Channel Settings window is used for the following operations:

- Apply equalization, see [“Making EQ settings”](#) on [page 83](#).
- Apply send effects, see the chapter “Audio effects” in the separate Plug-in Reference manual.
- Apply insert effects, see the chapter “Audio effects” in the separate Plug-in Reference manual.
- Copy channel settings and apply them to another channel, see [“Copying settings between audio channels”](#) on [page 85](#).

⚠ All channel settings are applied to both sides of a stereo channel.

Changing channels in the Channel Settings window

You can view any channel’s settings from a single window.

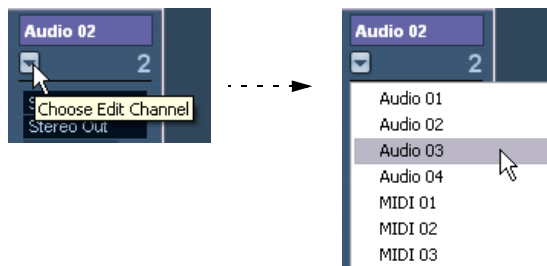
If the option “Sync Project and Mixer Selection” is activated in the Preferences (Editing–Project & Mixer page), this can be done “automatically”:

- Open the Channel Settings window for a track and position it so that you can see both the Project window and the Channel Settings window.

Selecting a track in the Project window automatically selects the corresponding channel in the mixer (and vice versa). If a Channel Settings window is open, this will immediately switch to show the settings for the selected channel. This allows you to have a single Channel Settings window open in a convenient position on the screen, and use it for all your EQ and channel effect settings.

You can also select a channel manually (thereby changing what is shown in the open Channel Settings window). Proceed as follows:

1. Open the Channel Settings window for any channel.
2. Open the Choose Edit Channel pop-up menu by clicking the arrow button to the left of the channel number at the top of the Fader view.



3. Select a channel from the pop-up to show the settings for that channel in the open Channel Settings window.

Alternatively, you can select a channel in the mixer by clicking its channel strip (make sure not to click on a control as this will change the respective parameter setting instead).

This selects the channel, and the Channel Settings window is updated.

- To open several Channel Settings windows at the same time, press [Alt]/[Option] and click the Edit buttons for the respective channels.

Making EQ settings

Each audio channel in Cubase AI has a built-in parametric equalizer with up to four bands. There are several ways to view and adjust the EQs:

- By selecting the “Equalizers” or “Equalizer Curve” tab in the Inspector.

Setting EQ in the Inspector is only possible for track-based audio channels.

⇒ Note that by default, only the Equalizers tab is shown. To display the Equalizer Curve tab, right-click on an Inspector tab (not in the empty area below the Inspector) and activate the “Equalizer Curve” option.

- By using the Channel Settings window.

This offers both parameter sliders and a clickable curve display (the Equalizer + Curve pane) and also lets you store and recall EQ presets.

⚠ Below we describe how to set up EQ in the Channel Settings window, but the parameters are the same in the Inspector.

The Equalizers + Curve pane in the Channel Settings window consists of four EQ modules with parameter sliders, an EQ curve display and some additional functions at the top.



Using the parameter controls

1. Activate an EQ module by clicking its power button. Although the modules have different default frequency values and different Q names, they all have the same frequency range (20Hz to 20kHz). The only difference between the modules is that the “eq1” and “eq4” bands can act as shelving or high/low-pass filters (see below).
2. Set the amount of cut or boost with the gain control – the upper slider. The range is ± 24 dB.
3. Set the desired frequency with the frequency slider. This is the center frequency of the frequency range (20Hz to 20kHz) to be cut or boosted.

4. Click on the lower slider (to the left) to open the filter type pop-up menu and select the desired filter type. Note that EQ 2 and EQ 3 can only act as bandpass filters.

5. Set the Q value with the lower slider (to the right). This determines the width of the affected frequency range. Higher values give narrower frequency ranges.

6. If needed, you can activate and make settings for up to four modules.

- Note that you can edit the values numerically as well, by clicking in a value field and entering the desired gain, frequency or Q value.

Using the curve display

When you activate EQ modules and make settings, you will see that your settings are automatically reflected in the curve display above. You can also make settings directly in the curve (or combine the two methods any way you like):

1. To activate an EQ module, click in the curve display. This adds a curve point and one of the modules below is activated.
2. Make EQ settings by dragging the curve point in the display. This allows you to adjust gain (drag up or down) and frequency (drag left or right).
3. To set the Q parameter, press [Shift] and drag the curve point up or down. You will see the EQ curve become wider or narrower as you drag.
- You can also restrict the editing by pressing [Ctrl]/[Command] (sets gain only) or [Alt]/[Option] (sets frequency only) while you drag the curve point.
4. To activate another EQ module, click somewhere else in the display and proceed as above.
5. To turn off an EQ module, double-click its curve point or drag it outside the display.

EQ bypass

Whenever one or several EQ modules are activated for a channel, the EQ button will light up in green in the mixer channel strip, Inspector (Equalizer and Channel sections), Track list and Channel Settings window (top right corner of the EQ section).

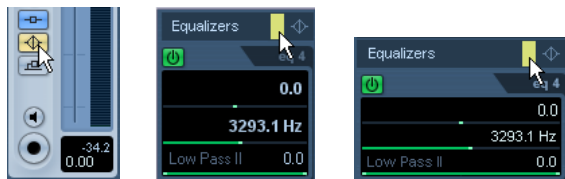
You can also bypass all EQ modules. This is useful, as it allows you to compare the sound with and without EQ. Proceed as follows:

- In the mixer, the Track list and in the Channel section in the Inspector, click the EQs state button so that it turns yellow.

To deactivate EQ Bypass, click the button again, so that it turns green again.

- In the Inspector (Equalizers tab) and in the Channel Settings window, click the Bypass button (next to the EQ button) so that it turns yellow.

Click again to deactivate EQ Bypass mode.

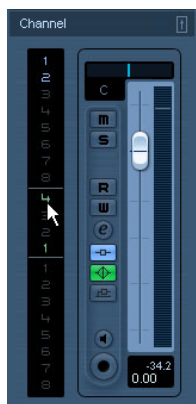


EQ bypass in the mixer, the Channel Settings window and in the Inspector.

EQ in the channel overview

If the “Channel” section is selected in the Inspector, you will get an overview of which EQ modules, insert effects and effect sends are activated for the channel.

By clicking the respective indicator (1 to 4), you can turn the corresponding EQ module on or off.



The channel overview in the Inspector.

Copying settings between audio channels

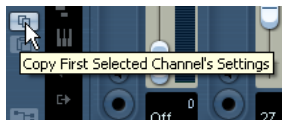
It is possible to copy all channel settings for an audio channel and paste them to one or several other channels. This applies to all audio-based channel types. For example, you can copy EQ settings from an audio track and apply these to a group or VST Instrument channel, if you want them to have the same sound.

Proceed as follows:

1. In the mixer, select the channel you want to copy settings from.

You can also select channels with the Channel Select pop-up menu – see [“Changing channels in the Channel Settings window”](#) on [page 83](#).

2. Click the “Copy First Selected Channel’s Settings” button in the common panel.



3. Select the channel(s) you want to copy the settings to and click the “Paste Settings to Selected Channels” button (below the “Copy First Selected Channel’s Settings” button).

The settings are applied to the selected channel(s).

Initialize Channel and Reset Mixer

The Initialize Channel button can be found at the bottom in the Control Strip section of the Channel Settings window (if this section is not shown in the Channel Settings window, open the context menu and select “Control Strip” on the Customize View submenu). Initialize Channel resets the selected channel to the default settings.

Similarly, the mixer common panel holds a Reset Mixer/Reset Channels button – when you click this, you will be asked whether you want to reset all channels or just the selected channels.

The default settings are:

- All EQ, Insert and Send effect settings are deactivated and reset.
- Solo/Mute is deactivated.
- The fader is set to 0dB.
- Pan is set to center position.

Using group channels

You can route the outputs from multiple audio channels to a group. This enables you to control the channel levels using one fader, apply the same effects and equalization to all of them etc. To create a group channel, proceed as follows:

1. Select Add Track from the Project menu and select “Group Channel” from the submenu that appears.
2. Select the desired channel configuration and click OK. A group channel track is added to the Track list and a corresponding group channel strip is added to the mixer. By default the first group channel strip is labeled “Group 1”, but you can rename it just like any channel in the mixer.
3. Pull down the Output routing pop-up for a channel you want to route to the group channel, and select the group channel.
The output of the audio channel is now redirected to the selected group.
4. Do the same for the other channels you wish to route to the group.

Settings for group channels

The group channel strips are (almost) identical to audio channel strips in the mixer. The descriptions of the mixer features earlier in this chapter apply to group channels as well. Some things to note:

- You can route the output of a group to an output bus or to another group with a higher number.

You cannot route a group to itself. Routing is done with the Output Routing pop-up menu in the Inspector (select the subtrack for the Group in the Track list).

- There are no Input Routing pop-ups, Monitor buttons or Record-Enable buttons for group channels.

This is because inputs are never connected directly to a group.

- Solo functionality is automatically linked for channels routed to a group and the group channel itself.

This means that if you solo a group channel, all channels routed to the group are automatically soloed as well. Similarly, soloing a channel routed to a group will automatically solo the group channel.

- Mute functionality depends on the setting “Group Channels: Mute Sources as well” in the Preferences (VST page). By default, when you mute a group channel no audio will pass through the group. However, other channels that are routed directly to that group channel will remain unmuted. If any of those channels have aux sends routed to other group channels, FX channels or output busses, those will still be heard.

If the option “Group Channels: Mute Sources as well” is activated in the Preferences (VST page), muting a group channel will cause all other channels directly routed to it to be muted as well. Pressing mute again will unmute the group channel and all other channels directly routed to it. Channels that were muted prior to the group channel being muted will not remember their mute status and will be unmuted when the group channel is unmuted.

⚠ The option “Group Channels: Mute Sources as well” does not affect how mute automation is written. Writing mute automation on a group channel only affects the group channel and not channels routed to it. When writing the automation, you will see the other channels being muted when this option is activated. However, upon playback, only the group channel will respond to the automation.

One application of group channels is to use them as “effect racks” – see the chapter “Audio effects” in the separate Plug-in Reference manual.

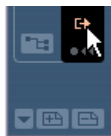
About output busses

Cubase AI uses a system of input and output busses which are set up using the VST Connections dialog. This is described in the chapter “[VST Connections: Setting up input and output busses](#)” on [page 9](#).

Output busses let you route audio from the program to the outputs on your audio hardware.

Viewing the output busses in the mixer

Output busses are shown as output channels in a separate pane to the right in the mixer. You show or hide this pane by clicking the Hide Output Channels button in the mixer’s common panel to the left:



Each output channel resembles a regular audio channel strip. Here you can do the following:

- Adjust master levels for all configured output busses using the level faders.
- Add effects or EQ to the output channels (see the chapter “Audio effects” in the separate Plug-in Reference manual).

MIDI specific procedures

This section describes basic procedures for MIDI channels in the mixer.

Using Channel Settings

For each MIDI channel strip in the mixer (and MIDI track in the Track list or the Inspector), there is an Edit (“e”) button.

Clicking this opens the MIDI Channel Settings window. By default, this window contains a duplicate of the mixer channel strip and the fader control strip.

You can customize the Channel Settings window by right-clicking the window and activating/deactivating the options on the Customize View submenu.

- To change the order of the panels, select “Setup” on the Customize View pop-up menu and use the “Move up” and “Move Down” buttons.

Every MIDI channel has its own channel settings.

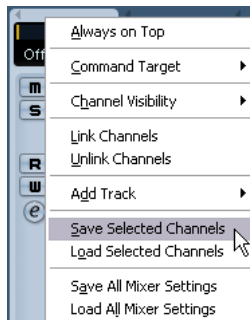


The MIDI Channel Settings window.

Utilities

Saving mixer settings

- ⚠ Saving/Loading mixer settings does not apply to MIDI channels in the mixer – only audio-related channels (group, audio, instrument, effect return, VSTi) are saved with this function!



It is possible to save complete mixer settings for selected or all audio channels in the mixer. These can later be loaded into any project. Channel settings are saved as mixer settings files. These have the Windows file extension “.vmx”.

Right-clicking somewhere in the mixer panel or in the Channel Settings window brings up the Mixer context menu where the following Save options can be found:

- “Save Selected Channels” will save all channel settings for the selected channels.
Input/output routings are not saved.
- “Save All Mixer Settings” saves all channel settings for all channels.

When you select any of the above options, a standard file dialog opens where you can select a name and storage location on your disk for the file.

Loading mixer settings

Load Selected Channels

To load mixer settings saved for selected channels, proceed as follows:

1. Select the same number of channels in the new project to match the number of channels you saved settings for in the previous project.

For example, if you saved settings for six channels, select six channels in the mixer.

- Mixer settings will be applied in the same order as they were in the mixer.

Thus, if you save settings from channels 4, 6 and 8 and apply these settings to channels 1, 2 and 3, the settings saved for channel 4 would be applied to channel 1, the settings saved for channel 6 to channel 2 and so on.

2. Right-click the mixer panel to open the context menu, and select “Load Selected Channels”.

A standard file dialog appears, where you can locate the saved file.

3. Select the file and click “Open”.

The channel settings are applied to the selected channels.

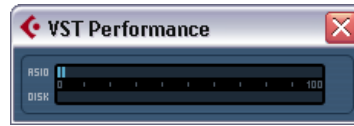
⚠ If you choose to apply mixer settings to fewer channels than you saved, the order of the saved channels in the mixer applies – i.e. the saved channels that are “left over” and not applied will be the channels with the highest channel numbers (or furthest to the right in the mixer).

Load All Mixer Settings

Selecting “Load All Mixer Settings” from the context menu allows you to open a saved mixer settings file, and have the stored settings applied to all channels for which there is information included in the file. All channels, master settings, VST Instruments, sends and master effects will be affected.

⇒ Please note that if the saved mixer settings were for 24 channels, for example, and the mixer you apply it to currently contains 16 channels, only the settings for channels 1 to 16 will be applied – this function will not automatically add channels.

About the VST Performance window



The VST Performance window is opened by selecting it from the Devices menu. It indicates the current load on the CPU and the hard disk transfer rate. It is recommended that you check this from time to time, or keep it always open. Even though you have been able to activate a number of audio channels in the project without getting any warning, you may run into performance problems when adding EQ or effects.

- The upper bar graph shows the CPU (processor) load. If the red Overload indicator lights up, you need to decrease the number of EQ modules, active effects and/or audio channels playing back simultaneously.

- The lower bar graph shows the hard disk transfer load. If the red overload indicator lights up, the hard disk is not supplying data fast enough to the computer. You may need to reduce the number of tracks playing back by using the Disable Track function (see [“About track disable/enable”](#) on page 42). If this doesn’t help, you need a faster hard disk. Note that the overload indicator may occasionally blink, e.g. when you locate during playback. This does not indicate a problem, but happens because the program needs a moment for all channels to load data for the new playback position.

⇒ The CPU and Disk load meters can also be shown on the Transport panel (as “Performance”) and on the Project window toolbar (as “Performance Meter”).

There they are shown as two miniature vertical meters (by default at the left side of the panel/toolbar).

10

Automation

Background

Cubase AI provides very comprehensive automation features. Virtually every mixer and effect parameter can be automated.

There are two main methods you can use to automate parameter settings:

- By manually drawing curves on automation tracks in the Project window.

See ["Editing automation events"](#) on [page 96](#).



- By using the Write/Read buttons and adjusting parameters in the mixer.

See ["Using Write/Read automation"](#) on [page 93](#).



The methods are not different in terms of how the automation data is applied – they only differ in the way the automation events are created; manually drawing them or recording them. Any applied automation data will be reflected both in the mixer (a fader will move for example) and in a corresponding automation track curve (although this may be hidden).

About automation tracks

Audio tracks, group channel tracks and FX channel tracks all have automation tracks. These allow you to view and edit the automation of all mixer settings for the track, including settings for the track's insert effects. There is one automation "subtrack" for each track, on which the different automation parameters can be displayed.

Similarly, MIDI tracks have an automation track for automating mixer settings and MIDI Modifiers.

VST Instruments have special automation tracks that appear in the Project window when you add a VST Instrument. There is one automation track for the plug-in parameters, and one track for each mixer channel used by the instrument. These tracks also have an automation track, giving you access to all parameters and mixer settings.

For Instrument tracks, as a combination of a MIDI track and a VST Instrument, the automation track provides automation parameters for the VST Instrument itself, for the VST Instrument channel and the respective MIDI automation parameters.

Finally, for output channels, automation tracks are automatically added as soon as you activate automation (the Write button) in the corresponding mixer channel strip or in the Channel Settings window.

What can be automated?

Mixing in Cubase AI can be completely automated. The following parameter settings can be recorded automatically – or manually drawn in – on automation tracks:

For each audio or group track

- Volume
- Mute
- Pan
- 8 x insert effect program selection and effect parameters (if inserts are used)
- 8 x effect send settings (on/off, level, pan)
- Settings for 4 EQ modules (Master Bypass, on/off, Type, Gain, Freq., Quality)

For each FX channel track and output bus

- Volume
- Mute
- Pan
- 8 x insert effect program selection and effect parameters (if inserts are used)
- Settings for 4 EQ modules (Master Bypass, on/off, Type, Gain, Freq., Quality)

For each VST Instrument

- VST Instrument plug-in parameters and program selection
- plus (for each mixer channel/separate output used by the instrument):

- Volume
- Mute
- Pan
- 8 x insert effect program selection and effect parameters (if inserts are used)
- 8 x effect send settings (on/off, level, pan)
- Settings for 4 EQ modules (Master Bypass, on/off, Type, Gain, Freq., Quality)

For each MIDI track

- Volume
- Pan
- Mute
- MIDI Modifiers on/off switch
- Transpose
- Vel. shift
- Random 1-2 min/max/target
- Range 1-2 min/max/target

For each Instrument track

As Instrument tracks are a combination of a MIDI track, an instrument and an Instrument Return channel in the Mixer, the automation track for instrument tracks features all parameters that are available for VST instruments plus the parameters for MIDI tracks (see the respective sections above) except MIDI Volume, Pan and Mute, because the parameters Volume, Pan and Mute are controlled directly via the Instrument Return channel in the Mixer.

Automation track operations

Opening automation tracks

Every track/channel has an automation track.

For audio, Instrument, group channel, MIDI and FX channel tracks, there are two ways you can open the automation track:

- By right-clicking the track in the Track list and selecting “Show Automation” from the context menu.
- By clicking on the left border of the track in the Track list. (When you position the mouse pointer over the lower left corner of the track, the respective arrow icon (“Show/Hide Automation”) appears.)

An automation track opens in the Track list, and a straight black horizontal line is shown as well as a greyed out mirror image of the audio events’ waveform (or MIDI events for MIDI tracks) in the event display. By default, the volume parameter is assigned to the automation track.



Click here to open the automation track.

For VST Instruments (not for Instrument tracks, see above), automation tracks appear automatically when you add them in the VST Instruments window.

For output busses, automation tracks are automatically created when the Write automation button (see [“Using Write/Read automation” on page 93](#)) is activated in either:

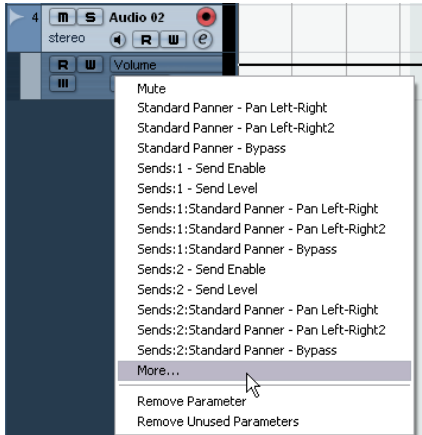
- The corresponding channel strip in the mixer.
- The corresponding Channel Settings window.
- The mixer common panel (“All Automation to Write Status”).
- The area above the Track list (“All Automation to Write Status”).

Assigning a parameter to an automation track

To make settings for an automation parameter, you have to select it from the pop-up menu.

1. Open the automation track for the desired track in the Track list, as described above.

2. Click in the parameter display for the automation track. A pop-up menu opens, containing some of the automation parameters plus the item "More..." at the bottom of the list. The contents of the list depend on the track type (audio, MIDI, VST instrument, etc.).



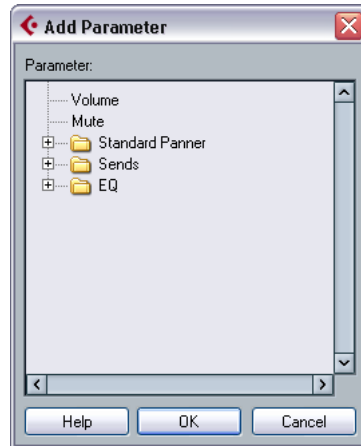
- If the parameter you wish to automate is on the pop-up menu, you can select it directly.

The parameter will replace the current parameter in the automation track.

- If you wish to add a parameter not available on the pop-up menu or want to view all parameters that can be automated, go on to the next step.

3. Select "More...".

The Add Parameter dialog appears. This dialog shows a list with all parameters that can be automated for the selected channel (sorted into different categories), including the parameters for any assigned insert effects. See ["What can be automated?"](#) on [page 90](#) for a list of the available parameters according to channel type. To view the parameters in each category click the "+" sign for the category folder.



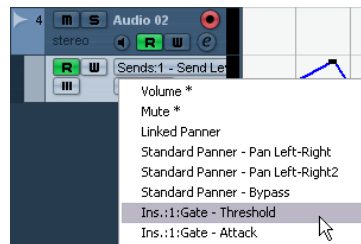
The Add Parameter dialog for an audio track.

4. Select a parameter from the list and click OK.

The parameter will replace the current parameter in the automation track.

⇒ Note that the "replacing" of the parameter displayed in the automation track is completely non-destructive.

If the track contained any automation data for the parameter you just replaced, this data will still be there, although it will not be visible after you replaced the parameter. If you click in the parameter display you can switch back to the replaced parameter. All automated parameters are indicated by an asterisk (*) after the parameter name on the pop-up menu.



Volume and Mute are automated.

Removing automation

To remove all automation for the selected parameter, click the parameter name and select “Remove Parameter” from the pop-up menu. This will delete any automation events on the track, and the automation track will be closed.

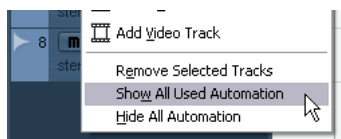
Hiding automation tracks

To hide a single automation track, you have two possibilities:

- Position the pointer over the top left border of the automation track in the Track list and click the “Hide Automation Track” button (the minus sign).
- Right-click the track for which you wish to hide the automation track, and select “Hide Automation” from the context menu.

To hide the automation tracks for all tracks in the Track list, right-click any track and select “Hide All Automation” from the context menu.

Hiding unused automation tracks



To hide all empty automation tracks (i.e. automation tracks that were opened but do not contain any automation data), proceed as follows:

- Right-click any track in the Track list and select “Show All Used Automation” from the pop-up menu.

This will close all automation tracks not containing any automation events. For tracks that have automated parameters, the automation track is shown for the first (topmost) parameter in the Parameter list.

Muting automation



You can mute individual automation parameters by clicking the Mute button on the automation track. Clicking the Read (R) button (see “Using Write/Read automation” on [page 93](#)) for an automation track will activate or deacti-

vate Read mode for all automated parameters of the track. Using the Mute button allows you to turn off automation for a single parameter.

The “Automation follows Events” setting

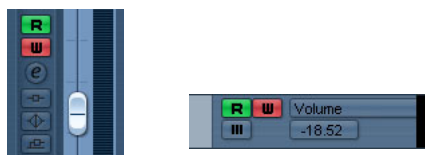
If you activate “Automation follows Events” on the Edit menu (or in the Preferences dialog—Editing page), automation events will automatically follow when you move an event or part on the track.

This makes it easy to set up automation related to a specific event or part, rather than to a specific position in the project. For example, you can automate the panning of a sound effect event (having the sound pan from left to right, etc.) – if you need to move the event, the automation will automatically follow! The rules are:

- All automation events for the track between the start and end of the event or part will be moved.
If there are automation events in the new position (to which you move the part or event), these will be overwritten.
- If you copy an event or part (using Copy/Paste, or [Alt]/[Option]-dragging, or using the Duplicate or Repeat functions), the automation events will be duplicated as well.

Using Write/Read automation

All track types except folder, marker, video and ruler tracks feature Write (W) and Read (R) buttons in the mixer, in the Track list and in the Channel Settings window. Furthermore, the control panels for all plug-in effects and VST Instruments also feature Write and Read buttons.



The Write and Read buttons for a channel in the mixer and for an automation track in the Track list.

- If you activate Write for a channel, all mixer parameters you adjust during playback for that specific channel will be recorded as automation events.
- If you activate Read for a channel, all your recorded mixer actions for that channel will be performed during playback, just like you performed them in Write mode.

- The W and R buttons for a track in the Track list are mirrors of the W and R buttons in the corresponding channel strip in the mixer.

There are also global Read and Write buttons in the common panel of the mixer and at the top of the Track list:



The global Write and Read buttons in the mixer, and in the Track list.

- When global Read (“All Automation to Read Status”) is activated, all your recorded mixer actions for all channels will be performed during playback.
- When global Write (“All Automation to Write Status”) is activated, all mixer actions you perform during playback (for all channels) will be recorded as automation events.

MIDI Controller Input to Automation Tracks

If you have set up a remote device to control parameters and settings in the program, you can record automation with that remote device – just activate Write as usual. However, if you are recording a MIDI track and want to record automation at the same time, the controller data sent by the remote device will be recorded “twice” – as automation and as MIDI controller data on the MIDI track.

To avoid this, activate “MIDI Controller Input to Automation Tracks” in the Preferences dialog (MIDI page). When this is activated, the controllers will be recorded as automation only, not as MIDI controller data on the recorded MIDI track.

Recording your actions – an example

If the settings in your current project are crucial, you may not want to “experiment” with automation until you know more about it. If so, create a new project for the following example. It doesn’t even have to contain audio events, just a few audio tracks. Proceed as follows:

1. Open the Mixer window.
2. Click the global Write button (“All Automation to Write Status”) in the mixer common panel.
Cubase AI is now in global Write mode.

3. Start playback and adjust some volume faders and/or other parameter settings in the mixer or perhaps in a Channel Settings window.

Stop playback when you are done, and return to the position where you started playback.

4. Deactivate Write mode and click the global Read button (“All Automation to Read Status”) in the mixer common panel.

Cubase AI is now in global Read mode.

5. Start playback, and watch the Mixer window.

All your actions performed during the previous playback will be reproduced exactly.

6. If you wish to redo anything that was recorded, activate Write mode again and start playback from the same position.

- You can have Write and Read activated simultaneously, if you want to watch and listen to your recorded mixer actions while you’re recording fader movements for another mixer channel, etc.

Recording plug-in automation

Every parameter for every assigned effect or VST Instrument can be automated in much the same manner as described above.

The following example assumes that you have assigned an insert effect to an FX channel track (see the chapter “Audio effects” in the separate pdf document “Plug-in Reference”), and describes how to record automation for the effect:

1. Select the FX channel track in the Track list and open its Inserts section in the Inspector.

If the Inspector is hidden, click the “Show Inspector” button in the Project window toolbar.

⇒ Please note that not all Inspector tabs are shown by default. You can show/hide Inspector sections by right-clicking on an Inspector tab and activating/deactivating the desired option(s).

Make sure to click on an Inspector tab and not on the empty area below the Inspector, as this will open the Quick context menu instead.

2. Open the control panel for the effect by clicking the Edit button (“e”) above the insert effect slot in the Inspector.

3. Click the Write button in the control panel to activate Write mode.

All effects and VST Instruments have Write/Read buttons on their control panels. These work exactly like the corresponding buttons in the mixer or in the Track list. In the previous example, we used global Write mode, in which mixer and parameter changes are recorded on all tracks, but in this example we'll use Write mode for one track only.

4. Start playback and adjust some effect parameters in the control panel.

When you are finished, stop playback and return to the position where you started playback.

5. Deactivate Write and instead click the Read button on the control panel.

6. Start playback and watch the control panel.

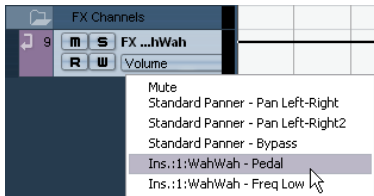
All actions you performed during the previous playback will be reproduced exactly.

Assigning an automated parameter to an automation track

To select which parameter is currently shown in the automation track for the FX channel, proceed as follows:

1. Click on the parameter name for the FX channel automation track.

The parameter name pop-up list is shown containing the automation parameters for the plug-in. The parameter(s) you previously automated are indicated by an asterisk after the parameter name in the list.



The parameters for the WahWah effect.

2. Select the parameter you wish to view from the parameter pop-up.

The automation curve for the parameter you selected is displayed on the automation track.

- To view VST Instrument parameters, you use the same method.

As described earlier, each VST Instrument has two or more automation tracks – one for the plug-in settings and one for each VST Instrument mixer channel.

Working with automation curves

About automation curves

There are two kinds of automation curves, “ramp” and “jump”:

- Jump curves are created for any parameter that only has on/off values, like a Mute button, for example.
- Ramp curves are created for any parameter that generates continuous multiple values, such as fader or dial movements etc.



A ramp automation curve



A jump automation curve

About the static value line

When you first open an automation track for a parameter, it doesn't contain any automation events (unless you have previously adjusted that parameter with write automation activated), and this is reflected in the event display as a straight horizontal black line, the “static value” line. This line represents the current parameter setting.

- If you have manually added any automation events or used write automation for the corresponding parameter, and then deactivate Read mode, the automation curve will be greyed-out in the automation track event display and the static value will be used instead.

As soon as Read mode is activated, the automation curve will become available.

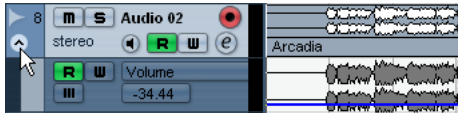
Editing automation events

Drawing automation events

By using write automation in the mixer, you generate automation events by moving parameter dials and faders in the mixer. You can also add them manually by drawing automation curves on an automation track. Proceed as follows:

1. Open the automation track by clicking on the left edge of the track in the Track list.

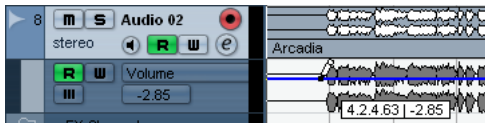
The static value line is shown in the event display for the automation track.



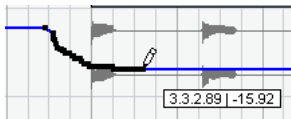
2. Select the Pencil tool.

You can also use the various modes of the Line tool for drawing curves, see below.

3. If you click on the static value line, an automation event is added, Read automation mode is automatically activated, and the static value line changes to a blue automation curve.

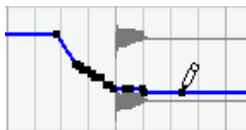


4. If you click and hold, you can draw a curve by adding a multitude of single automation events.



5. When you release the mouse button, the number of automation events is reduced to a few events, but the basic shape of the curve still remains the same.

This “thinning out” of events is governed by the Automation Reduction Level setting in the Preferences, see [“About the Automation Reduction Level preference”](#) on [page 98](#).



6. If you now activate playback, the volume will change with the automation curve.

In the mixer, the corresponding fader moves accordingly.

7. Simply redo the operation if you are not happy with the result.

If you draw over existing events, a new curve is created.

- If the automation track is in Read mode already, you can also add automation events by clicking with the Arrow tool.

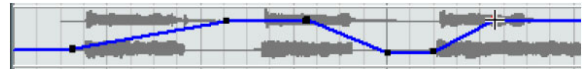
If you are trying to add a point between two existing points and the new point doesn't deviate from the existing curve, it will be removed by reduction as soon as you release the mouse button (see [“About the Automation Reduction Level preference”](#) on [page 98](#)).

Using the various modes of the Line tool to draw automation curves

The Line tool can be very useful for drawing automation curves. The various modes are accessed by selecting the Line tool on the toolbar, clicking on it a second time and selecting from the pop-up menu that appears.

- Clicking and dragging with the Line tool in Line mode shows a line in the automation track and creates automation events aligned with this line.

This is a quick way to create linear fades, etc.



- The Line tool in Parabola mode works in the same way, but aligns the automation events with a parabolic curve instead, resulting in more “natural” curves and fades. Note that the result depends on the direction in which you draw the parabolic curve.



- The Sine, Triangle and Square Line tool modes create automation events aligned with continuous curves.

If Snap is activated and set to Grid, the period of the curve (the length of one curve “cycle”) is determined by the grid setting. If you press [Shift] and drag, you can set the period length manually, in multiples of the grid value.



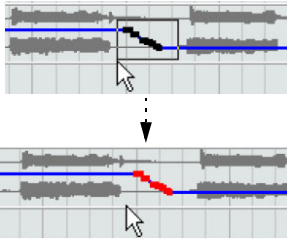
Selecting automation events

- To select a single automation curve point, click on it with the Arrow tool.

The point turns red, and you can drag it in any horizontal or vertical direction between two points.

- To select multiple curve points, you can either [Shift]-click or drag a selection rectangle with the Arrow tool.

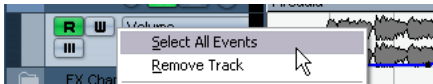
All events inside the selection rectangle will become selected.



Drawing a selection rectangle around some points to select them.

When selected, the points can be moved in all directions as “one”, i.e. the curve shape formed by the selected events remains intact.

- To select all automation events on an automation track, right-click the automation track in the Track list and choose “Select All Events” from the context menu.



Removing automation events

There are several ways to remove automation events:

- By selecting points and pressing [Backspace] or [Delete] or selecting Delete from the Edit menu.
- By clicking on an event with the Eraser tool.
- By selecting a range (with the Range Selection tool), and pressing [Backspace] or [Delete] or selecting Delete from the Edit menu.
- By opening the parameter pop-up menu for an automation track and selecting “Remove Parameter”.

This will remove all automation events from the track, and the track will be closed.

Editing automation events

Automation events can be edited much like other events. You can use cut, copy and paste, you can nudge events etc. There are, however, four items on the Edit menu that are not applicable to automation events. These are:

- Split at Cursor
- Split Loop
- Move to Front
- Move to Back

Tips and common methods

There are no hard and fast rules when it comes to describing which automation method you should use. You can for example never even open an automation track, and stick with write automation throughout a project. Or you can stick to drawing automation curves to automate settings in a project. Both methods have their advantages, but it is of course up to you to decide what to use and when.

- Editing curves on automation tracks offers a graphical overview in relation to the track contents and the time position.

This makes it easy to quickly change parameter values at specific points, without having to activate playback. For example, this method gives you a good overview if you have a voice-over or a dialog on one track and a music bed on another track, the level of which needs to be lowered with a specific amount every time the dialog occurs.

- By using write automation in the mixer you don't have to manually select parameters from the Add Parameter list. You can work much like you would using a “real” physical mixer. Every action you perform is automatically recorded on automation tracks which you can later open for viewing and editing of the parameters you changed.

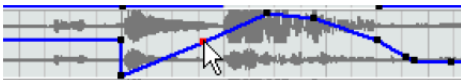
These are just two examples of advantages for each method. Generally, editing curves and using write automation are two methods that complement each other, and depending on the nature of your projects you will probably work out what method works best for a given situation.

Options and Settings

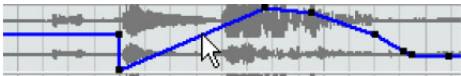
About the Automation Reduction Level preference

This item can be found on the Editing page in the Preferences dialog. Automation reduction reduces the number of automation events after you have used write automation or added automation events manually. When you write automation events or draw them in with the Pencil tool, these are added as a continuous stream of densely packed events. This is necessary because the program cannot “guess” what you will be doing next. However, when you are done, the reduction function will remove all superfluous automation curve points and the automation curve now contains only the events necessary to reproduce your actions.

For example, all events that lie between two other points, but do not deviate from the curve, will be automatically removed by reduction.



If you try to add an event that doesn't deviate from the existing curve between two existing points...



...it will be removed when the mouse is released. If you move the selected event by any amount so that the resulting curve isn't a straight line, the event will be added.

- If you feel you need a lower (or higher) reduction level of events than the default setting, you can change it, but normally the default setting works well.
- A minimum reduction level setting is not recommended as this will retain a lot of unnecessary events.

Background

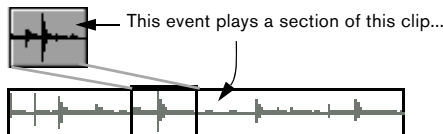
Audio processing in Cubase AI can be called “non-destructive”, in the sense that you can always undo your last operation using the Undo command on the Edit menu. This is possible because processing affects audio clips rather than the actual audio files, and because audio clips can refer to more than one audio file. This is how it works:

1. If you process an event or a selection range, a new audio file is created in the Edits folder, within your project folder.

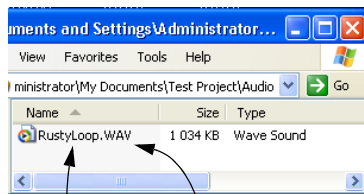
This new file contains the processed audio, while the original file is unaffected.

2. The processed section of the audio clip (the section corresponding to the event or selection range) then refers to the new, processed audio file.

The other sections of the clip will still refer to the original file.



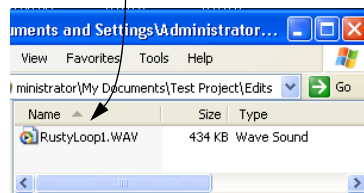
...which refers to this audio file.



After processing the event...



...the clip will refer both to the original file and a new file, containing the processed section only.



- Furthermore, the original, unprocessed audio file can still be used by other clips in the project, by other projects or by other applications.

Audio processing

Basically, you apply processing by making a selection and selecting a function from the Process submenu on the Audio menu. Processing is applied according to the following rules:

- Selecting events in the Project window or the Audio Part Editor will apply processing to the selected events only.

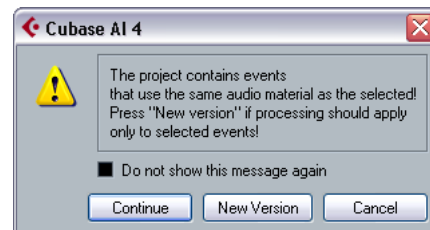
Processing will only affect the clip sections that are referenced by the events.

- Selecting an audio clip in the Pool will apply processing to the whole clip.

- Making a selection range will apply processing to the selected range only.

Other sections of the clip are not affected.

If you attempt to process an event that is a shared copy (i.e. the event refers to a clip that is used by other events in the project), you are asked whether you want to create a new version of the clip or not.



Select “New Version” if you want the processing to affect the selected event only. Select “Continue” if you want the processing to affect all shared copies.

⇒ If you activate the “Do not show this message again” option, any and all further processing you do will conform to the selected method (“Continue” or “New Version”). You can change this setting at any time by using the “On Processing Shared Clips” pop-up in the Preferences (Editing–Audio page).

Common settings and features

If there are any settings for the selected Audio processing function, these will appear when you select the function from the Process submenu. While most settings are specific for the function, some features and settings work in the same way for several functions:

The “More...” button

If the dialog has a lot of settings, some options may be hidden when the dialog appears. To reveal these, click the “More...” button.



To hide the settings, click the button again (now labeled “Less...”).

The Preview, Process and Cancel buttons

These buttons have the following functionality:

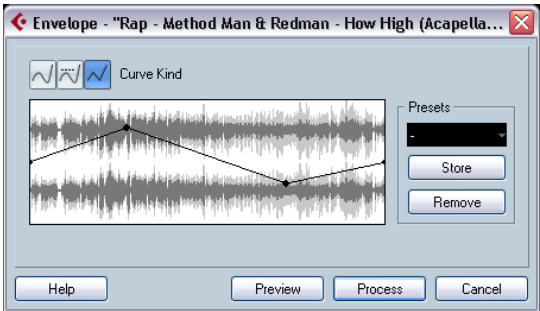
Button	Description
Preview	Allows you to listen to the result of the processing with the current settings. Playback will continue repeatedly until you click the button again (the button is labeled “Stop” during Preview playback). You can make adjustments during Preview playback, but the changes are not applied until the start of the next “lap”. Some changes may automatically restart the Preview playback from the beginning.
Process	Performs the processing and closes the dialog.
Cancel	Closes the dialog without processing.

Pre/Post-CrossFade

Some processing functions allow you to gradually mix the effect in or out. This is done with the Pre/Post-CrossFade parameters. If you activate Pre-CrossFade and specify a value of e.g. 1000 ms, the processing will be applied gradually from the start of selection, reaching full effect 1000 ms after the start. Similarly, if you activate Post-CrossFade, the processing will gradually be removed, starting at the specified interval before the end of the selection.

⚠ The sum of the Pre- and Post-CrossFade times cannot be larger than the length of the selection.

Envelope



The Envelope function allows you to apply a volume envelope to the selected audio. The dialog contains the following settings:

Curve Kind buttons

These determine whether the envelope curve should consist of spline curve segments (left button), damped spline segments (middle button) or linear segments (right button).

Fade display

Shows the shape of the envelope curve. The resulting waveform shape is shown in dark grey, with the current waveform shape in light grey. You can click on the curve to add points, and click and drag existing points to change the shape. To remove a point from the curve, drag it outside the display.

Presets

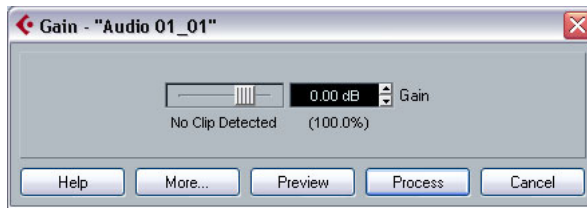
If you have set up an envelope curve that you may want to apply to other events or clips, you can store it as a preset by clicking the Store button.

- To apply a stored preset, select it from the pop-up menu.
- To rename the selected preset, double-click on the name and enter a new one in the dialog that appears.
- To remove a stored preset, select it from the pop-up menu and click Remove.

Fade In and Fade Out

For a description of these functions, see the chapter “[Fades and crossfades](#)” on [page 58](#).

Gain



Allows you to change the gain (level) of the selected audio. The dialog contains the following settings:

Gain

This is where you set the desired gain, between -50 and +20dB. The setting is also indicated below the Gain display as a percentage.

Clipping detection text

If you use the Preview function before applying the processing, the text below the slider indicates whether the current settings result in clipping (audio levels above 0dB). If that is the case, lower the Gain value and use the Preview function again.

- If you want to increase the level of the audio as much as possible without causing clipping, you should use the Normalize function instead (see [“Normalize”](#) on [page 103](#)).

Pre- and Post-CrossFade

See [“Pre/Post-CrossFade”](#) on [page 101](#).

Merge Clipboard



This functions mixes the audio from the clipboard into the audio selected for processing, starting at the beginning of the selection.

- ⚠ For this function to be available, you need to have cut or copied a range of audio in the Sample Editor first.

The dialog contains the following settings:

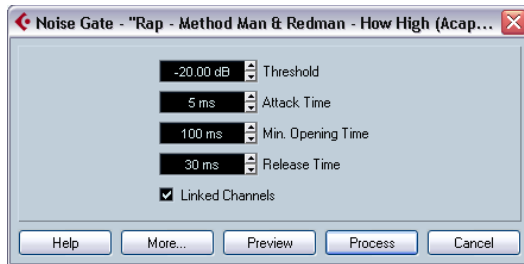
Sources mix

Allows you to specify a mix ratio between the original (the audio selected for processing) and the copy (the audio on the clipboard).

Pre- and Post-CrossFade

See [“Pre/Post-CrossFade”](#) on [page 101](#).

Noise Gate



Scans the audio for sections weaker than a specified threshold level and replaces them with silence. The dialog contains the following settings:

Threshold

The level below which you want audio to be silenced. Levels below this value will close the gate.

Attack Time

The time it takes for the gate to open fully after the audio level has exceeded the threshold level.

Min. Opening Time

This is the shortest time the gate will remain open. If you find that the gate opens and closes too often when processing material that varies rapidly in level, you should try raising this value.

Release Time

The time it takes for the gate to close fully after the audio level has dropped below the threshold level.

Linked Channels

This is available for stereo audio only. When it is activated, the Noise Gate is opened for both channels as soon as one or both channels exceed the Threshold level. When Linked Channels is deactivated, the Noise Gate works independently for the left and right channel.

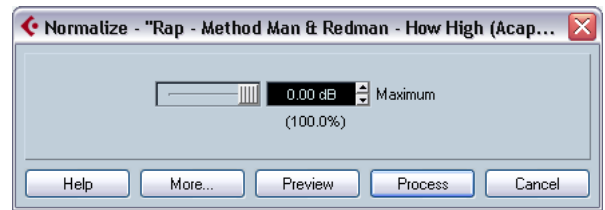
Dry/Wet mix

Allows you to specify a mix ratio between “dry” and processed sound.

Pre- and Post-CrossFade

See [“Pre/Post-CrossFade”](#) on [page 101](#).

Normalize



The Normalize function allows you to specify the desired maximum level of the audio. It then analyzes the selected audio and finds the current maximum level. Finally it subtracts the current maximum level from the specified level and raises the gain of the audio by the resulting amount (if the specified maximum level is lower than the current maximum, the gain will be lowered instead). A common use for Normalizing is to raise the level of audio that was recorded at too low an input level. The dialog contains the following settings:

Maximum

The desired maximum level for the audio, between -50 and 0dB. The setting is also indicated below the Gain display as a percentage.

Pre- and Post-CrossFade

See [“Pre/Post-CrossFade”](#) on [page 101](#).

Phase Reverse

Reverses the phase of the selected audio, turning the waveform “upside down”. The dialog contains the following settings:

Phase Reverse on

When processing stereo audio, this pop-up menu allows you to specify which channel(s) should be phase-reversed.

Pre- and Post-CrossFade

See [“Pre/Post-CrossFade”](#) on [page 101](#).

Remove DC Offset

This function will remove any DC offset in the audio selection. A DC offset is when there is too large a DC (direct current) component in the signal, sometimes visible as the signal not being visually centered around the “zero level axis”. DC offsets do not affect what you actually hear, but they affect zero crossing detection and certain processing, and it is recommended that you remove them.

⚠ It is recommended that this function is applied to complete audio clips, since the DC offset (if any) is normally present throughout the entire recording.

There are no parameters for this function.

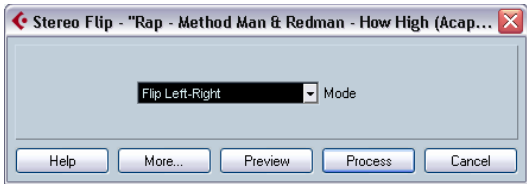
Reverse

Reverses the audio selection, as when playing a tape backwards. There are no parameters for this function.

Silence

Replaces the selection with silence. There are no parameters for this function.

Stereo Flip



This function works with stereo audio selections only. It allows you to manipulate the left and right channel in various ways. The dialog contains the following parameters:

Mode



This pop-up menu determines what the function does:

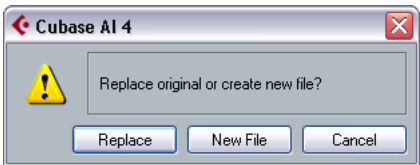
Option	Description
Flip Left-Right	Swaps the left and right channel.

Option	Description
Left to Stereo	Copies the left channel sound to the right channel.
Right to Stereo	Copies the right channel sound to the left channel.
Merge	Merges both channels on each side for mono sound.
Subtract	Subtracts the left channel information from the right and vice versa. This is typically used as a “Karaoke effect”, for removing centered mono material from a stereo signal.

Freeze Edits

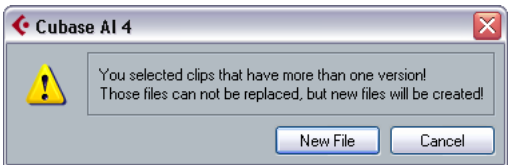
The Freeze Edits function on the Audio menu allows you to make all processing permanent for a clip:

1. Select the clip in the Pool or one of its events in the Project window.
2. Select “Freeze Edits...” from the Audio menu.
 - If there is only one edit version of the clip (no other clips refer to the same audio file), the following dialog will appear:



If you select “Replace”, all edits will be applied to the original audio file (the one listed in the clip’s Path column in the Pool). If you select “New File”, the Freeze Edits operation will create a new file in the Audio folder within the project folder (leaving the original audio file unaffected).

- If the selected clip (or the clip played by the selected event) has several edit versions (i.e. there are other clips referring to the same audio file), the following alert will appear:



As you can see, you don’t have the option to Replace the original audio file in this case. This is because that audio file is used by other clips. Select “New File” to have a new file created in the Audio folder within the project folder.

- ⚠ After a Freeze Edits, the clip refers to a new, single audio file.

Background

The Sample Editor allows you to view and manipulate audio at the audio clip level, by cutting and pasting, removing or drawing audio data or applying processing.

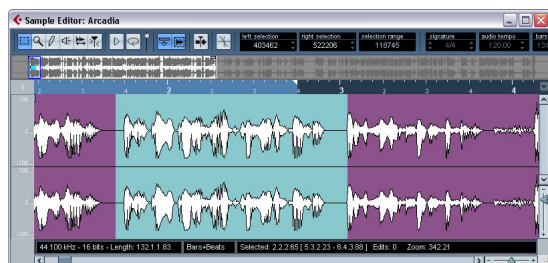
The Sample Editor also contains Audio Warp related features. These are described in the chapter [“Audio warp realtime processing”](#) on [page 117](#).

Opening the Sample Editor

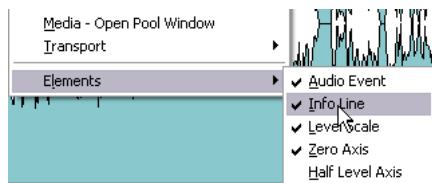
You open the Sample Editor by double-clicking an audio event in the Project window or the Audio Part Editor, or by double-clicking an audio clip in the Pool. You can have more than one Sample Editor open at the same time.

- Note that double-clicking an audio part in the Project window will open the Audio Part Editor, even if the part only contains a single audio event. This is described in the chapter [“The Audio Part Editor”](#) on [page 112](#).

Window overview



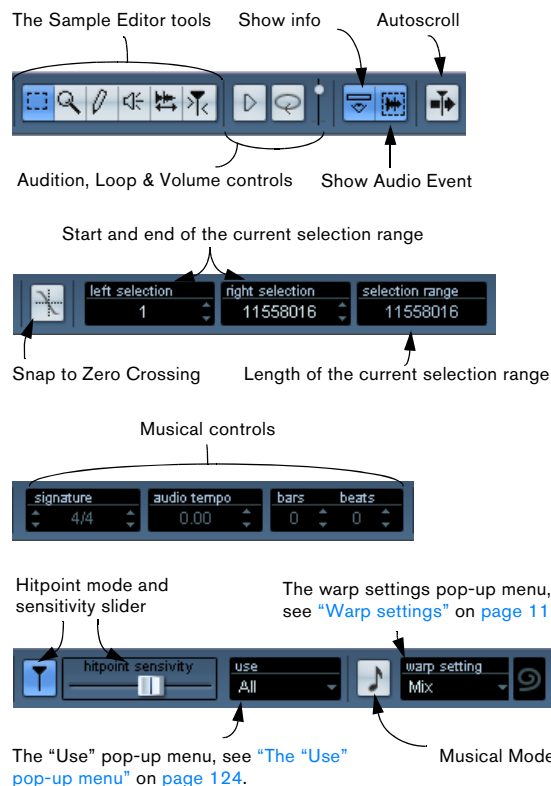
The Elements menu



If you right-click in the Sample Editor to bring up the Quick menu, you will find a sub menu called “Elements”. By activating or deactivating options on this submenu, you specify what is shown in the editor window. Some of these options are also available as icons on the toolbar.

The toolbar

The toolbar contains tools and various settings:



- You can customize the toolbar by right-clicking it and using the pop-up menu to hide or show items.
- Selecting Setup from the pop-up menu allows you to reorder sections on the toolbar, store presets, etc. See [“The Setup dialogs”](#) on [page 245](#).

The thumbnail display



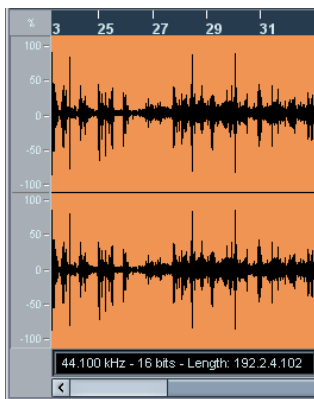
The thumbnail display provides an overview of the whole clip. The section currently shown in the main waveform display of the Sample Editor is indicated by a blue rectangle in the thumbnail, while the current selection range is shown in blue.

- You can move the blue rectangle in the thumbnail to view other sections of the clip.
Click in the lower half of the rectangle and drag to the left or right to move it.
- You can resize the blue rectangle (by dragging its left or right edge) to zoom in or out, horizontally.
- You can define a new viewing area by clicking in the upper half of the overview and dragging a rectangle with the pointer.

The ruler

The Sample Editor ruler is located between the thumbnail and the waveform display. It shows the timeline in the display format specified in the Project Setup dialog (see [“The Project Setup dialog”](#) on [page 21](#)). If you like, you can select an independent display format for the ruler by clicking on the arrow button to the right of it and selecting an option from the pop-up menu that appears (this affects the values in the info line, too). For a list of the display format options, see [“The ruler”](#) on [page 20](#).

The waveform display and the level scale

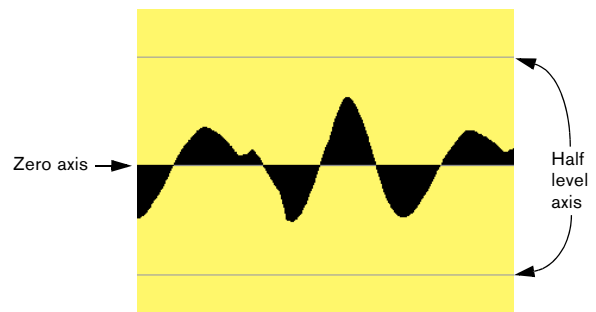


The waveform display shows the waveform image of the edited audio clip – in the style selected in the Preferences (Event Display–Audio page), see [“Adjusting how parts and events are shown”](#) on [page 24](#). To the left of the waveform display, a level scale can be shown, indicating the amplitude of the audio.

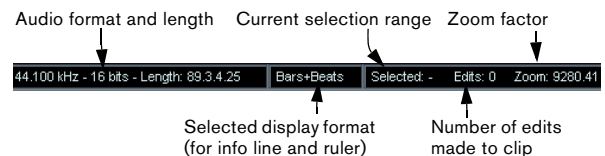
- When the level scale is shown, you can select whether the level should be shown as a percentage or in dB. This is done by right-clicking the level scale and selecting an option from the pop-up menu that appears. This also allows you to hide the level scale.



- To display the level scale after hiding it, right-click to bring up the Quick menu and activate “Level Scale” on the Elements submenu.
- This submenu also allows you to select whether you want the zero axis and/or the half level axis indicated in the waveform display.

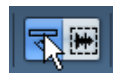


The info line



The info line at the bottom of the window shows information about the edited audio clip. You cannot edit the values on the info line.

- To hide or show the info line, click the Show Info button on the toolbar.



Initially, length and position values are displayed in the format specified in the Project Setup dialog (see [“The Project Setup dialog”](#) on [page 21](#)), but you can change this by clicking in the middle field of the info line and selecting another display format from a pop-up menu. This selection affects the Sample Editor ruler as well.

Operations

Zooming

Zooming in the Sample Editor is done according to the standard zoom procedures, with the following special notes:

- The vertical zoom slider changes the vertical scale relative to the height of the editor window, in a way similar to the waveform zooming in the Project window (see [“Zoom and view options”](#) on [page 22](#)).

The vertical zoom will also be affected if the option “Zoom Tool Standard Mode” (Preferences on the Editing–Tools page) is deactivated and you drag a rectangle with the Zoom tool.

- The following options relevant to the Sample Editor are available on the Zoom submenu (on the Edit menu and the Quick context menu):

Option	Description
Zoom In	Zooms in one step, centering on the position cursor.
Zoom Out	Zooms out one step, centering on the position cursor.
Zoom Full	Zooms out so that the whole clip is visible in the editor.
Zoom to Selection	Zooms in so that the current selection fills the screen.
Zoom to Event	Zooms in so that the editor shows the section of the clip corresponding to the edited audio event. This is not available if you opened the Sample Editor from the Pool (in which case the whole clip is opened for editing, not an event).
Zoom In/Out Vertical	This is the same as using the vertical zoom slider (see above).

- You can also zoom by resizing the rectangle in the thumbnail display.
See [“The thumbnail display”](#) on [page 106](#).

- The current zoom setting is shown in the info line, as a “samples per screen pixel” value.

- Note that you can zoom in horizontally to a scale with less than one sample per pixel!

This is required for drawing with the Pencil tool (see [“Drawing in the Sample Editor”](#) on [page 111](#)).

- If you have zoomed in to one sample per pixel or less, the appearance of the samples depend on the option “Interpolate Audio Images” in the Preferences (Event Display–Audio page).
If the option is deactivated, single sample values are drawn as “steps”. If the option is activated, they are interpolated to “curves” form.

Auditioning

While you can use the regular play commands to play back audio when the Sample Editor is open, it is often useful to listen to the edited material only. Below are two ways to do this.

⇒ You can adjust the auditioning level with the miniature level fader on the toolbar.

By using the Speaker tool

If you click somewhere in the waveform display with the Speaker (“Play”) tool and keep the mouse button pressed, the clip will be played back from the position at which you clicked. Playback will continue until you release the mouse button.

By using the Audition icon



Clicking the Audition icon on the toolbar plays back the edited audio, according to the following rules:

- If you have made a selection, this selection will be played back.
- If there is no selection, but the option “Show Event” is activated (see [“Show audio event”](#) on [page 111](#)), the section of the clip corresponding to the event will be played back.
- If there is no selection, and “Show Event” is deactivated, playback will start at the cursor position (if the cursor is outside the display, the whole clip will be played back).
- If the Loop icon is activated, playback will continue repeatedly until you deactivate the Audition icon. Otherwise, the section will be played back once.

Scrubbing



The Scrub tool allows you to locate positions in the audio by playing back, forwards or backwards, at any speed:

1. Select the Scrub tool.

2. Click in the waveform display and keep the mouse button pressed.

The project cursor is moved to the position at which you click.

3. Drag to the left or right.

The project cursor follows the mouse pointer and the audio is played back. The speed and pitch of the playback depends on how fast you move the pointer.

- You can adjust the response of the Scrub tool with the Scrub Response (Speed) setting in the Preferences (VST-Scrub page).

There you will also find a separate Scrub Volume setting.

Adjusting the snap point

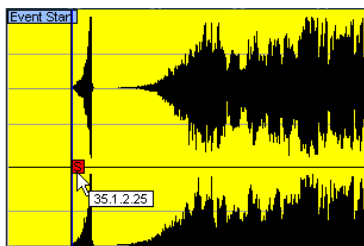
The snap point is a marker within an audio event (or clip, see below). This is used as a reference position when you are moving events with snap activated, so that the snap point is “magnetic” to whatever snap positions you have selected.

By default, the snap point is set at the beginning of the audio event, but often it is useful to move the snap point to a “relevant” position in the event, such as a downbeat, etc.

1. Activate the “Audio Event” option so that the event is displayed in the editor.

2. Scroll so that the event is visible, and locate the “S” flag in the event.

If you haven’t adjusted this previously, it will be located at the beginning of the event.



3. Click on the “S” flag and drag it to the desired position.

When you drag the snap point, a tool tip shows its current position (in the format selected on the Sample Editor ruler).

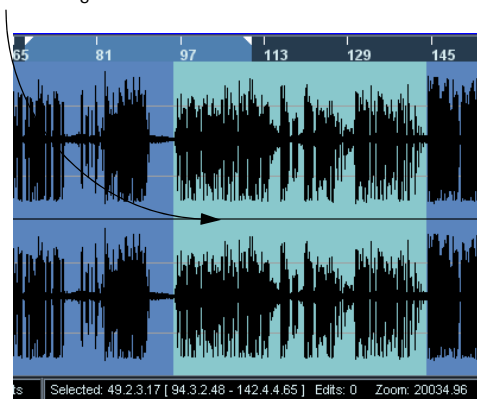
- It is also possible to define a snap point for a clip (for which there is no event yet).

To open a clip in the Sample Editor, double-click it in the Pool (or drag it from the Pool to the Sample Editor). After having set the snap point using the procedure described above, you can insert the clip into the project from the Pool or the Sample Editor, taking the snap point position into account.

Making selections

To select an audio section in the Sample Editor, you click and drag with the Range Selection tool.

A selected range



- If Snap to Zero Crossing is activated on the toolbar, the start and end of the selection will always be at zero crossings (see “[Snap to Zero Crossing](#)” on [page 111](#)).

- You can resize the selection by dragging its left and right edge or by [Shift]-clicking.

- The current selection is indicated by the selection controls on the toolbar.

You can fine-tune the selection by changing these values numerically. Note that the values are relative to the start of the clip, rather than to the project timeline.

Using the Select submenu

The following options on the Select submenu of the Edit menu can be used in the Sample Editor:

Function	Description
All	Selects the whole clip.
None	Selects no audio (the selection length is set to "0").
In Loop	Selects all audio between the left and right locator.
From Start to Cursor	Selects all audio between the clip start and the project cursor.
From Cursor to End	Selects all audio between the project cursor and the end of the clip. For this to work, the project cursor must be within the clip boundaries.
Select Event	Selects the audio that is included in the edited event only. This is not available if you opened the Sample Editor from the Pool (in which case the whole clip is opened for editing, not an event).
Left Selection Side to Cursor	Moves the left side of the current selection range to the project cursor position. For this to work, the cursor must be within the clip boundaries.
Right Selection Side to Cursor	Moves the right side of the current selection range to the project cursor position (or the end of the clip, if the cursor is to the right of the clip).

Editing selection ranges

Selections in the Sample Editor can be manipulated in several ways. Please note:

- If you attempt to edit an event that is a shared copy (i.e. the event refers to a clip that is used by other events in the project), you are asked whether you want to create a new version of the clip or not (if you haven't made a "permanent" choice already – see below).

Select "New Version" if you want the editing to affect the selected event only. Select "Continue" if you want the editing to affect all shared copies. Note: If you activate the option "Do not show this message again" in the dialog, any further editing you do will conform to the selected method ("Continue" or "New Version"). You can change this setting at any time with the "On Processing Shared Clips" pop-up menu in the Preferences (Editing–Audio page).

Cut, Copy and Paste

The Cut, Copy and Paste commands on the Edit menu work according to the following rules:

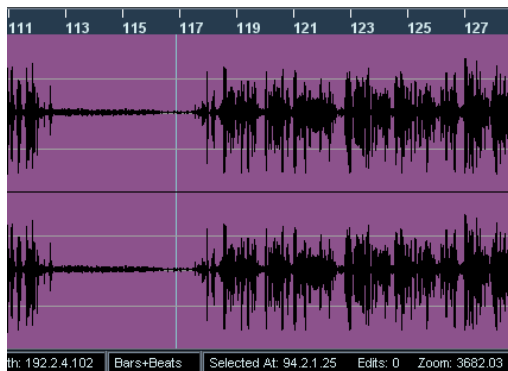
- Selecting Copy copies the selection to the clipboard.

- Selecting Cut removes the selection from the clip and moves it to the clipboard.

The section to the right of the selection is moved to the left to fill out the gap.

- Selecting Paste copies the data on the clipboard into the clip.

If there is a selection in the editor, this will be replaced by the pasted data. If there is no selection (if the selection length is "0"), the pasted data will be inserted starting at the selection line. The section to the right of the line will be moved to make room for the pasted material.



The pasted data will be inserted at the selection line.

Insert Silence

Selecting "Insert Silence" from the Range submenu on the Edit menu will insert a silent section with the same length as the current selection, at the selection start.

- The selection will not be replaced, but moved to the right to make room.

If you want to replace the selection, use the "Silence" function instead (see "Silence" on [page 104](#)).

Delete

Selecting Delete from the Edit menu (or pressing [Backspace]) removes the selection from the clip. The section to the right of the selection is moved to the left to fill out the gap.

Processing

The functions on the Process submenu on the Audio menu can be applied to selections in the Sample Editor, see the chapter "Audio processing and functions" on [page 99](#).

Creating a new event from the selection

You can create a new event that plays only the selected range, using the following method:

1. Make a selection range.
2. Press [Ctrl]/[Command] and drag the selection range to the desired audio track in the Project window.

Creating a new clip or audio file from the selection

You can extract a selection from an event and either create a new clip or a new audio file, in the following way:

1. Make a selection range.
2. Select “Bounce Selection” from the Audio menu.

A new clip is created and added to the Pool, and another Sample Editor window will open with the new clip. The new clip will refer to the same audio file as the original clip, but will only contain the audio corresponding to the selection range.

Drawing in the Sample Editor

It is possible to edit the audio clip at sample level by drawing with the Pencil tool. This can be useful if you need to manually edit out a spike or click, etc.

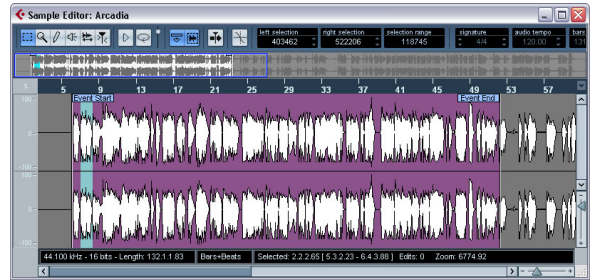
1. Zoom in to a zoom value lower than 1.
This means that there is more than one screen pixel per sample.
2. Select the Pencil tool.
3. Click and draw at the desired position in the waveform display.
When you release the mouse button, the edited section is automatically selected.

Options and settings

Show audio event

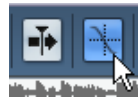
⚠ This is only available if you opened the Sample Editor by double-clicking an audio event in the Project window or the Audio Part Editor.

When the option “Audio Event” is activated on the Elements submenu on the Quick menu (or the Show Audio Event button is activated on the toolbar), the section corresponding to the edited event is highlighted in the waveform display and Thumbnail. The sections of the audio clip not belonging to the event are shown with a grey background.



- In this mode, you can adjust the start and end of the event in the clip by dragging the event handles in the waveform display.
When you move the pointer over the event handles (no matter what tool may be selected), it takes on the shape of an arrow, to indicate that you can click and drag.

Snap to Zero Crossing



Snap to Zero Crossing activated.

When this option is activated, all audio edits are done at zero crossings (positions in the audio where the amplitude is zero). This helps you avoid pops and clicks which might otherwise be caused by sudden amplitude changes.

- This setting affects the Sample Editor only. In the Project window and other editors, the Snap to Zero Crossing setting on the Project menu toolbar or in the Preferences (Editing–Audio page) is used.

Autoscroll



Autoscroll activated.

When this option is activated, the waveform display will scroll during playback, keeping the project cursor visible in the editor.

Background

The Audio Part Editor allows you to view and edit the events inside audio parts. Essentially, this is the same type of editing that you do in the Project window, which means that this chapter contains a lot of references to the chapter “[The Project window](#)” on [page 14](#).

Audio parts are created in the Project window, in one of the following ways:

- By selecting one or several audio events on the same track, and selecting “Events to Part” from the Audio menu.
- By gluing together two or more audio events on the same track with the Glue Tube tool.
- By drawing an empty part with the Pencil tool.
- By double-clicking between the left and right locator on an audio track.

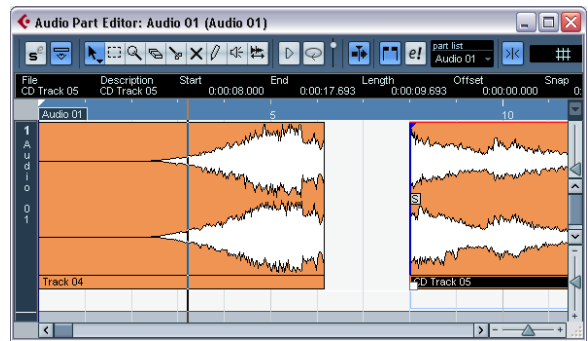
With the last two methods, an empty part is created. You can then add events to the part by pasting, or by using drag and drop from the Pool.

Opening the Audio Part Editor

You open the Audio Part Editor by selecting one or more audio part(s) in the Project window and double-clicking on any one of them (or using the Edit-Open key command, by default [Ctrl]/[Command]+[E]). The Audio Part Editor can display several parts at once, and you can also have more than one Audio Part Editor open at the same time.

- Note that double-clicking on an audio event in the Project window will open the Sample Editor (see “[Opening the Sample Editor](#)” on [page 106](#)).

Window overview



The toolbar

The tools, settings and icons on the toolbar have the same functionality as in the Project window, with the following differences:

- A Solo button (see “[Auditioning](#)” on [page 115](#)).
- Separate tools for auditioning (Speaker) and scrubbing (see “[Scrubbing](#)” on [page 115](#)).
- No Line, Glue Tube or Color tool.
- Play and Loop icons and an Audition Volume control (see “[Auditioning](#)” on [page 115](#)).
- Part List controls for handling several parts: Activating parts for editing, restricting editing to active parts only and showing part borders (see “[Handling several parts](#)” on [page 115](#)).

⇒ You can customize the toolbar, hiding or reordering its items.

See “[The Setup dialogs](#)” on [page 245](#).

The ruler and info line

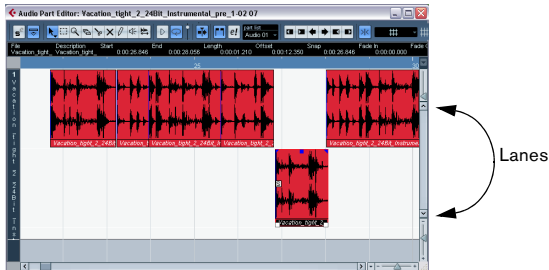
These have the same functionality and appearance as their counterparts in the Project window.

- Note that you can select a separate display format for the Audio Part Editor ruler by clicking on the arrow button on the right and selecting an option from the pop-up menu that appears.

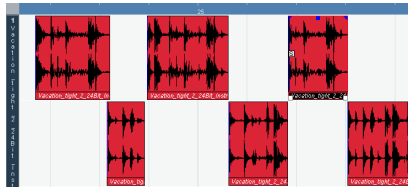
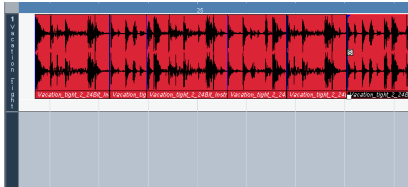
For a list of the available formats, see “[The ruler](#)” on [page 20](#).

About lanes

If you make the editor window larger, this will reveal additional space below the edited events. This is because an audio part is divided vertically in lanes.



Lanes can make it easier to work with several audio events in a part:



In the top figure it is unnecessarily hard to discern, select and edit the separate events. In the bottom figure, some of the events have been moved to a lower lane, making selection and editing much easier.

- To move an event to another lane without accidentally moving it horizontally, press [Ctrl]/[Command] and drag it up or down.

This is the default modifier key for this – you can adjust this in the Preferences if you like.

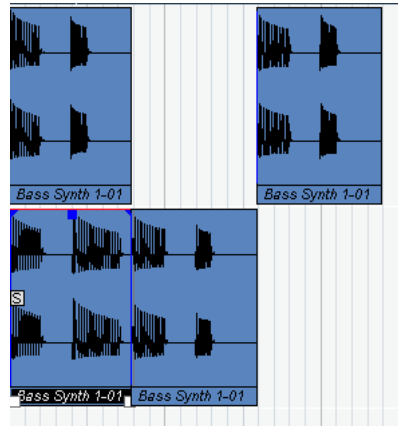
Overlapping events

Only one event per track can be played back at the same time! This means that if you have overlapping events (on the same lane or different lanes) these will cut each other off, according to the following rules:

- For events on the same lane, the ones that are on top (visible) will be played.

To move overlapping events to the front or back, use the Move to Front and Move to Back functions on the Edit menu.

- For events on different lanes, the event on the lowest lane gets playback priority.



The overlapping sections of the upper event will not be played since the event on the lower lane has playback priority!

Operations

⚠ Zooming, selecting and editing in the Audio Part Editor is done just as in the Project window (see [“Operations”](#) on [page 21](#)).

- Note that if a part is a shared copy (i.e. you have previously copied the part by [Alt]/[Option]+[Shift]-dragging), any editing you perform will affect all shared copies of this part.

To indicate that it is a shared copy, its name is displayed in italics and a symbol is displayed in the lower right corner of the part in the Project window (see [“Duplicating events”](#) on [page 30](#)).

Auditioning

There are three ways to listen to the events in the Audio Part Editor:

By using the Speaker tool

If you click somewhere in the editor’s event display with the Speaker tool and keep the mouse button pressed, the part will be played back from the position where you clicked. Playback will continue until you release the mouse button.

By using the Audition icon



The Audition and Audition Loop icons.

Clicking the Audition icon on the toolbar plays back the edited audio, according to the following rules:

- If you have selected events in the part, only the section between the first and last selected event will be played back.
- If you have made a range selection, only this section will be played back.
- If there is no selection, the whole part will be played back. If the project cursor is within the part, playback starts from the current cursor position. If the cursor is outside the part, playback starts from the beginning of the part.
- If the Audition Loop icon is activated, playback will continue until you deactivate the Audition icon. Otherwise, the section will be played back once.

By using regular playback

You can of course use the regular playback controls while in the Audio Part Editor. Furthermore, if you activate the Solo Editor button on the toolbar, only the events in the edited part will be played back.

Scrubbing

In the Audio Part Editor, the Scrub tool has a separate icon on the toolbar. Apart from that, scrubbing works exactly as in the Project window (see [“Scrubbing”](#) on [page 27](#)).

Handling several parts

When you open the Audio Part Editor with several parts selected – all on the same track or on different tracks – they might not all “fit” in the editor window, which can make it hard to get an overview of the different parts when editing.

Therefore, the toolbar features a few functions to make working with multiple parts easier and more comprehensive:

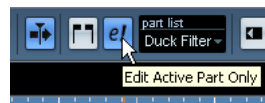
- The Part List menu lists all parts that were selected when you opened the editor, and lets you select which part should be active for editing. When you select a part from the list, it is automatically made active and centered in the display.



⇒ Note that it is also possible to activate a part by clicking on it with the Arrow tool.

- The button “Edit Active Part Only” lets you restrict editing operations to the active part only.

If you for example select “All” from the Select submenu on the Edit menu with this option activated, all events in the active part will be selected but not the events in other parts.



“Edit Active Part Only” activated on the toolbar.

- You can zoom in on an active part so that it fills the screen by selecting “Zoom to Event” from the Zoom sub-menu on the Edit menu.
- The button “Show Part Borders” can be used if you want to see clearly defined borders for the active part. When this is activated, all parts except the active one are grayed out, making the borders easily discernible. There are also two “markers” in the ruler with the name of the active part, marking its beginning and end. These can be moved freely to change the part borders.



“Show Part Borders” activated on the toolbar.

- It is possible to cycle between parts, making them active, with key commands.
- In the Key Commands dialog – Edit category, there are two functions: “Activate Next Part” and “Activate Previous Part”. If you assign key commands to these, you can use them to cycle between parts. Please refer to [“Setting up key commands”](#) on [page 251](#) for instructions on how to set up key commands.

Common methods

Assembling a “perfect take”

When you record audio in Cycle mode, the events created during each lap are named “Take X”, where “X” is the number of the take. You can create a perfect take by putting together sections of the different takes in the Audio Part Editor.

⇒ The procedure below will not work if you recorded with “Keep Last” mode selected on the Transport panel. In that case, only the last take will be kept on the track.

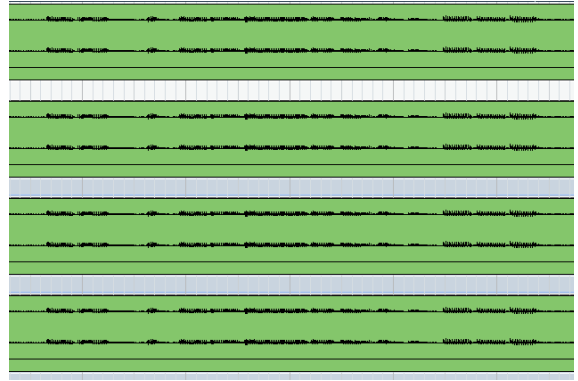
First, you have to create an audio part from the takes.

Creating an audio part from events

1. In the Project window, use the Object Selection tool to draw a rectangle around the recorded events. This is necessary, since clicking on the event may just select the event on top (the last take). If in doubt, check the info line – the info text should be yellow.
2. Pull down the Audio menu and select “Events to Part”. The events are converted to an audio part.

Assembling a take

1. Double-click the part to open the Audio Part Editor. Now the different takes will be placed on different lanes, with the last take at the bottom.



2. Use the tools to cut out pieces of the takes and assemble the final result. This can include splitting with the Scissors tool, resizing events with the Arrow tool or deleting with the Eraser tool.
 - Remember that the events on the lowest lane have playback priority.

Use the Audition icon to audition the result.
3. Close the Audio Part Editor. You have now assembled a “perfect take”!

Options and Settings

The following options and settings are available in the Audio Part Editor:

- **Snap**
You can specify an independent Snap mode (and snap value for the Grid mode) in the editor. The functionality is exactly the same as in the Project window.
- **Autoscroll**
When Autoscroll is activated on the toolbar, the window will scroll during playback, keeping the project cursor visible in the editor. This setting can be activated or deactivated individually for each window.
- **Snap to Zero Crossing**
When this option is activated, all audio edits are done at zero crossings (positions in the audio where the amplitude is zero). This helps you avoid pops and clicks which might otherwise be caused by sudden amplitude changes.

Background

Audio warp is the generic name for the realtime time stretching and pitch shifting functions in Cubase AI. The main audio warp features are as follows:

- Tempo match any audio loop to the project tempo – see [“Determining the tempo of an audio loop and activating Musical mode”](#) on page 118.
- Pitch shift any number of audio clips in realtime – see [“Realtime pitch shifting of audio events”](#) on page 120.
- Freeze the realtime processing to optimize the audio sound quality and lessen the CPU load – see [“Freezing the realtime processing”](#) on page 120.

About Musical mode

Musical mode is the key audio warp feature. It allows you to lock audio clips to the project tempo by using realtime time stretching.

When you activate Musical mode, you have to specify the tempo for the audio file or loop. In Musical mode, audio events will adapt to any tempo changes in Cubase AI, just like MIDI events.



The Musical Mode button is activated on the Sample Editor toolbar.

About ACID® loops

Cubase AI supports ACID® loops. These loops are standard audio files but with embedded tempo/length information. When ACID® files are imported into Cubase AI, Musical mode is automatically activated and the loops will adapt to the tempo set in the project.

Determining the tempo of an audio loop and activating Musical mode

⚠ ACID® loops, other commercial loops, and loops you created yourself containing tempo/length information will automatically have Musical mode activated when they are imported, and the steps below are not necessary.

You can adapt the tempo of an audio loop, i.e. an audio clip of a given musical length, to the project tempo in Cubase AI. Once Musical mode has been set, the loop will follow any tempo variations in realtime.

The first step is to import a loop. This could be any loop, just as long as it meets the basic criteria, e.g. a loop that is exactly 2 or 4 bars long at a given tempo (it doesn't matter if you don't know the tempo).

1. Import a suitable loop, for example a drum loop.
2. Double-click the loop to open it in the Sample Editor.
3. Click the Musical mode button (the note button) so that it lights up.

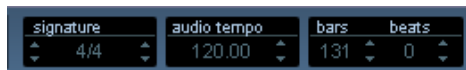


By default, the warp controls are situated on the far right in the Sample Editor toolbar.

4. In the dialog that appears, enter the original tempo of the loop (this is often part of the loop name, e.g. “SloGroove_105bpm”).

- On the toolbar, you can find three fields displaying the time signature, audio tempo and bars & beats, allowing you to inspect your settings. If the bar count is wrong for example, you should correct the tempo. This is done in the Tempo column in the Pool window (provided that Musical mode is deactivated in the Sample Editor).

If you have not specified the tempo in the Pool or (by activating Musical mode) in the Sample Editor, these fields will display the default setting of “0”.



The signature, audio tempo and tempo fields in the Sample Editor.

When the Musical mode is activated and the tempo is set, the loop is automatically stretched. On the Sample Editor toolbar, you can find a warp setting pop-up menu and a warp icon. The warp icon lights up if the audio clip is stretched or pitch-shifted/transposed.



On the “warp setting” pop-up, you can find various warp options that govern the audio quality of the realtime time stretching. There are presets for common types of audio material and an Advanced option where you can manually set warp parameters. See “[Warp settings](#)” on [page 119](#) for a description of these parameters.

5. Select the warp setting preset that best corresponds to the audio loop material and close the Sample Editor.
6. Activate playback.

Now the loop will automatically adjust to the project tempo, and follow any further tempo changes you make! In the Project window, the audio event will have a note symbol and two arrows in the lower right corner. The note symbol indicates Musical mode and the arrow indicates that the file is stretched.



Activating Musical mode from within the Pool

It is also possible to activate/deactivate Musical mode from within the Pool by clicking the respective checkbox in the Musical column.

When you have correctly set a tempo or length for an audio clip, this information is saved with the project. This allows you to import files into the project with Musical mode already activated. The tempo (if set) is also saved when exporting files.

If you import a new file into the Pool, or if a clip in the pool has not had tempo or length set, the tempo is unknown. If you try to activate Musical mode in the Pool for such files, a dialog appears where you have to enter the tempo before Musical mode is activated. The default value is the current project tempo.

Warp settings

The “warp setting” pop-up menu, which is located on the Sample Editor toolbar, contains various presets affecting the realtime time stretching sound quality. These presets have self-explanatory names like “Drums” and “Mix”, where the parameters involved have been optimized for the corresponding type of audio material.

The following warp settings are available:

Option	Description
Drums	This mode will best preserve the rhythmic accuracy of unpitched audio that contains many transients (e.g. drum loops). Using this option for pitched audio will lead to noticeable artefacts.
Plucked	This should be used for audio with transients and a relatively stable spectral sound character (e.g. plucked instruments).
Pads	Use this mode for pitched audio with slower rhythmic and a stable spectral sound character. This will minimize sound artefacts, but the rhythmic accuracy will not be preserved.
Vocals	This mode was optimized for slower signals with transients and a prominent tonal character (e.g. vocals).
Mix	This mode will preserve the rhythm and minimize the artefacts for pitched material which does not meet the above criteria (i.e. with a less homogenous sound character). This will be selected by default for audio that is not categorized.
Advanced	This allows for a manual tweaking of the time stretching parameters. By default, the settings that are shown when you open the dialog are those of the last used preset (except if the Solo mode was selected, see below). The Advanced settings are described in more detail below this table.
Solo	This mode will preserve the formants of the audio. It should only be used for monophonic material (solo woodwind/brass instruments or solo vocals, monophonic synths or string instruments that do not play harmonies).

Advanced settings

If you select the Advanced menu item, a dialog opens where you can manually change the three parameters that govern the sound quality of the time stretching:

Parameter	Description
Grainsize	The realtime time stretching algorithm splits the audio into small pieces called "grains". This parameter determines the size of the grains. For material with many transients you should use low Grainsize values for best results.
Overlap	Overlap is the percentage of the whole grain that will overlap with other grains. Use higher values for material with a stable sound character.
Variance	Variance is also a percentage of the whole length of the grains and sets a variation in positioning so that the overlapping area will sound smooth. A Variance setting of 0 will produce a sound akin to time stretching used in early samplers, whereas higher settings will produce more (rhythmic) "smearing" effects but less audio artefacts.

Realtime pitch shifting of audio events

Audio events can be pitch-shifted in real time just like MIDI events.

The process is very simple:

1. Select one or several audio events in the Project window.

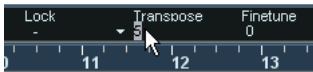
Audio parts cannot be transposed.

2. Open the event info line.



3. Set a value in the Transpose field to the far right on the info line.

The value range is up/down two octaves in semitone steps.



4. Press [Enter].

All selected audio events are now transposed to the set value using pitch shift. The same general rules apply as for other event editing on the info line, see ["The info line"](#) on [page 19](#).

- You can also fine-tune selected audio events in cent steps (100ths of a semitone) by entering a value in the Finetune field to the right.

⚠ Audio and MIDI events cannot be transposed simultaneously.

Freezing the realtime processing

You can "freeze" any realtime processing at any time. This can be done to serve two purposes; to conserve CPU power and to optimize the sound quality of the processing.

- Select the audio event(s) you wish to process and select "Freeze Timestretch and Transpose" from the Real-time Processing submenu of the Audio menu.

When the freeze processing is applied, a copy of the original file is automatically created in the Pool so that the original audio clip remains intact.

After freezing, the audio clip is like any standard audio clip before applying realtime processing, i.e. it will not follow tempo changes. The freeze processing function is best used when you have determined the tempo or key of a project, but you can of course always adapt the audio to a new key or tempo. In this case, it is better to revert back to the original audio clip rather than to process the already processed file again.

Background

Hitpoint detection is a special feature of the Sample Editor. It detects attack transients in an audio file and then adds a type of marker, a “hitpoint”, at each transient. These hitpoints allow you to create “slices”, where each slice ideally represents each individual sound or “beat” in a loop (drum or other rhythmic loops work best with this feature). When you have successfully sliced the audio file, you can do a number of useful things with it:

- Change the tempo without affecting the pitch.
- Replace individual sounds in a drum loop.
- Edit the actual playing in the drum loop without affecting the basic feel.
- Extract sounds from loops.

⇒ The term “loop” is used throughout this chapter. Loop in this context means an audio file with a musical time base, i.e. the length of the loop represents a certain number of bars and/or beats at a certain tempo. Playing the loop back at the right tempo in a cycle set to the correct length will produce a continuous loop without gaps.

Using hitpoints

The basic functionality of using hitpoints to slice up a loop is to make a loop fit the tempo of a song, or alternatively to create a situation that allows the song tempo to be changed while retaining the timing of a rhythmic audio loop, just like when using MIDI files.

Which audio files can be used?

Here are some guidelines as to what type of audio files are suited for slicing using hitpoints:

- Each individual sound in the loop should have some noticeable attack.
- Slow attacks, legato playing etc. may not produce the desired result.
- Poorly recorded audio might be difficult to slice correctly.
- In these cases, try to normalize the files or to remove DC Offset.
- There may be problems with sounds drowned in smear effects, like short delays.

Calculating hitpoints and slicing a loop – a quick tutorial

Before proceeding, find a suitable loop using the criteria above. Proceed as follows:

1. Open the event or clip for editing in the Sample Editor. You can do this by double-clicking an event on an audio track in the Project window or a clip in the Pool. In this example, we assume you work with an event on a track.
2. Click the Hitpoint Mode button on the toolbar. Now the Sensitivity slider is added, and the Use menu is activated. The items on this pop-up don't affect the actual detection but rather which hitpoints will be shown afterwards. If you e.g. know that your loop is based on 1/16th notes, select “1/16”. If you're uncertain, set this to “All” – you can change this setting afterwards if needed.



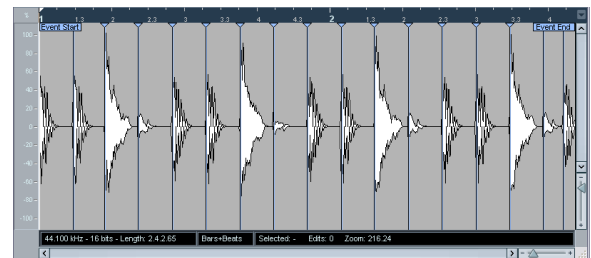
The Hitpoint Mode button

3. Select the Hitpoint Edit tool on the Sample Editor toolbar or open the Audio menu and select “Calculate Hitpoints” on the Hitpoints submenu. The hitpoints are detected.



The Hitpoint Edit tool

Now, as you can see, hitpoints have been set at the beginning of each sound in the loop.



4. If you now move the hitpoint sensitivity slider to the left, this gradually hides the hitpoints. Moving the slider to the right increases the sensitivity to reveal additional hitpoints detected during the calculate process.

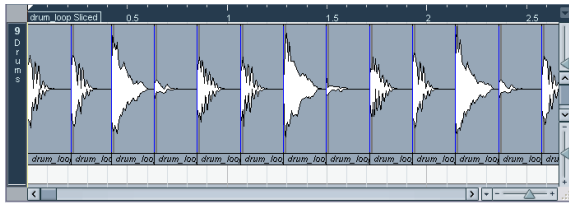
The basic aim is to add, remove or in various other ways edit the hitpoints so that one individual sound is played between each hitpoint. For details, see [“Editing hitpoints”](#) on [page 123](#).

In the next step, the loop will adapt to the project tempo set in Cubase AI.

5. Pull down the Audio menu and select “Create Audio Slices from Hitpoints” from the Hitpoints submenu.

The following happens:

- If the original tempo of the audio file is unknown, a dialog opens in which you are asked to enter it.
- The Sample Editor closes.
- The audio event is “sliced” so that there is a separate event for each hitpoint.
- The audio event is replaced by an audio part, containing the slices (double-click the part to view the slices in the Audio Part Editor).
- The loop is automatically adapted to the project tempo.



The slices in the Audio Part Editor. Here, the project tempo was higher than the loop's original tempo – the slice events overlap slightly.

▪ If you opened the Sample Editor for a clip in the Pool, you will find that the icon for the clip changes in the Pool (to indicate that it is sliced).

Dragging the sliced clip from the Pool to an audio track will create an audio part with the slices adapted to the project tempo, just as above.

6. If you activate cycle playback on the Transport panel, the loop should now play back seamlessly at the tempo set in the program!

▪ Note that if the project tempo is lower than the original tempo of the loop, there may be audible gaps between each slice event in the part.

This can be remedied by using the Close Gaps function on the Advanced submenu of the Audio menu, see [“Close Gaps”](#) on [page 127](#). You should also consider activating auto fades for the respective audio track – fade-outs set to about 10 ms will help eliminate any clicks between the slices when you play back the part. See [“Auto Fades and Crossfades”](#) on [page 64](#).

▪ If the project tempo is higher than the loop's original tempo, you may want to activate auto crossfades for the track.

You can use the Close Gaps functions in this case as well, see [“Close Gaps”](#) on [page 127](#).

Editing hitpoints

In this section, we go back a bit and look at what can be done with hitpoints in the Sample Editor. There are two ways to invoke the hitpoint calculation:

▪ Select Calculate Hitpoints from the Hitpoints submenu on the Audio menu.

▪ Select the Hitpoint Edit tool from the toolbar or Quick menu.

The last method will calculate hitpoints if they haven't already been calculated.

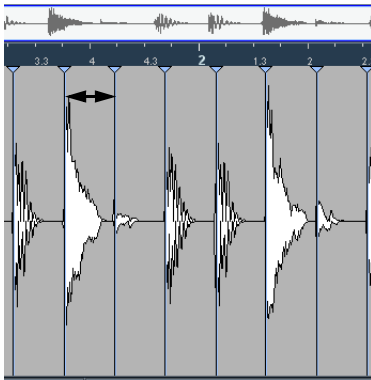
As outlined in the previous section, this makes the program calculate hitpoints in the audio event, and you can use the Sensitivity slider to change how many hitpoints are shown.

For some loops, this may be all that is needed to set the hitpoints so that each slice to be created will contain a single “hit” or sound. However, there will almost certainly be cases when the automatic calculation may add a hitpoint where there shouldn't be one, and fail to add a hitpoint where one is needed, even if the Sensitivity slider is set to maximum. If there are too many or too few hitpoints in a loop, it will not play back properly.

When this occurs, you have to edit the hitpoints manually in the Sample Editor.

Auditioning slices

A slice is a section of the waveform, from one hitpoint to the next.



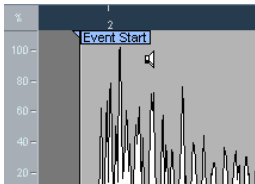
The first thing you should do before editing hitpoints is to listen to each slice in the Sample Editor to determine what they contain. The aim is to avoid “double hits”, like a snare hit being followed by a hi-hat hit within the same slice. You also want to determine whether any hitpoints have been added that should be removed:

1. Open a loop in the Sample Editor.

If you have already created slices, you can open them in the Sample Editor by double-clicking any event in the Audio Part Editor. If it is a new loop, follow the instructions in the tutorial.

2. Select the Hitpoint Edit tool.

When you point in the waveform display, the pointer changes to a speaker icon.



3. Now you can simply point and click in any slice area and the corresponding slice will be played back from the beginning to the end.

Listen for “double hits” and slices that contain parts of a single sound.

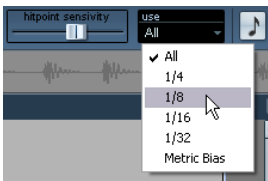
If you find hitpoints that need to be removed or instances where a hitpoint needs to be added, the first thing to try is to change the sensitivity setting – see the following section.

Setting the sensitivity

The loop is first analyzed to determine where hitpoints should appear (where the individual “beats” in the loop are), then you manually set the sensitivity with the Sensitivity slider to determine how many hitpoints there should be.

- Try raising the sensitivity to add “missing” hitpoints and lowering it to remove unwanted hitpoints. This may or may not work, depending on the situation, but as a general rule you should try this first.
- Audition the slices again to determine if changing the sensitivity has improved matters.

The “Use” pop-up menu



The “Use” pop-up menu on the toolbar affects which hitpoints are shown and is a useful tool for removing unwanted hitpoints. The options on the pop-up menu are:

Option	Description
All	All hitpoints are shown (taking the Sensitivity slider into account).
1/4, 1/8, 1/16, 1/32	Only hitpoints that are close to the selected note value positions within the loop will be shown (e.g. close to exact sixteenth note positions, if the 1/16 option is selected). Again, the Sensitivity slider is taken into account.
Metric Bias	This is like the “All” mode, but all hitpoints that are close to even meter divisions (1/4 notes, 1/8 notes, 1/16 notes, etc.) get a “sensitivity boost” – they are visible at lower Sensitivity slider settings. This is useful if you are working with dense or cluttered material with a lot of hitpoints, but you know that the material is based on a strict meter. By selecting Metric Bias it will be easier to find the hitpoints close to the meter position (although most other hitpoints are also available, at higher sensitivity settings).

How many slices do I need?

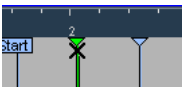
If your main reason for slicing the loop is to change the tempo, you generally need as many slices as you can get, but never more than one per individual “hit” in the loop.

Disabling slices

You might run into situations where there are too many slices – a single sound may have been split into two slices, for example. You could of course reduce the sensitivity to get rid of the hitpoints you don't want, but then other hitpoints could disappear too, which may be undesirable. What you need to do in a situation like this is to disable an individual slice using the Hitpoint Edit tool:

1. Select the Hitpoint Edit tool.
2. Press [Alt]/[Option] and move the pointer to the handle (the triangle).

The pointer turns into a cross in the Sample Editor window.



3. Click on the handle of the hitpoint you wish to disable. The hitpoint handle is diminished and its line disappears to indicate that it is disabled.
4. Now, the hitpoint won't be taken into account when you create slices.
5. To reactivate a disabled hitpoint, [Alt]/[Option]-click on the hitpoint handle with the Hitpoint Edit tool.

Locking slices

If you lock a hitpoint by clicking on its handle with the Hitpoint Edit tool, it will stay even if you drag the Sensitivity slider all the way to zero. This can be used in situations where one or several slices contain double hits, but raising the sensitivity adds a lot of unwanted slices.

1. Find the place where you hear double hits when auditioning.
2. Remember the current slider setting.
3. Raise the Sensitivity slider to a higher value so that a hitpoint appears, separating the two sounds. Most likely this will add a lot of other unwanted hitpoints as well.
4. Audition to make sure you got what you wanted.
5. Select the Hitpoint Edit tool and point at the handle. The speaker icon changes to a normal arrow pointer.
6. Lock the new slice by clicking on its handle. Locked hitpoints are displayed in a darker color.

7. Drag the Sensitivity slider to the original setting. The locked hitpoint will remain shown.

- You can unlock a locked hitpoint by clicking it again with the Hitpoint Edit tool with [Alt]/[Option] pressed.

Setting hitpoints manually

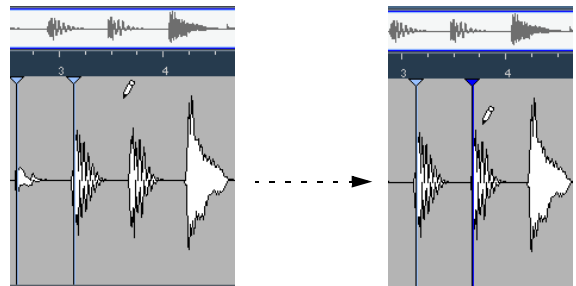
If you cannot get the desired result by adjusting sensitivity, disabling or locking, you can add, move and delete hitpoints manually.

Adding hitpoints

- ⚠ Snap to Zero Crossing may alter the timing. In some cases it might be better to deactivate it, however, if you create slices afterwards, auto fades will be necessary.

Manually adding hitpoints can be done in situations where a hitpoint is missing at a specific point, but doesn't appear even if the sensitivity is set to full.

1. Zoom in on the waveform at the point where you wish to add a hitpoint.
2. Audition the area with the Hitpoint Edit tool to make sure that the start of the sound is in view.
3. Activate Snap to Zero Crossing on the Sample Editor toolbar. By finding zero crossings in the waveform (positions where the amplitude is close to zero), manually added slices won't introduce any clicks or pops. All hitpoints found by the Calculate function are automatically placed at zero crossings.
4. Press [Alt]/[Option] with the Hitpoint Edit tool selected so that the mouse pointer changes to a pencil tool and click just before the start of the sound. A new hitpoint appears. Manually added hitpoints are locked by default.



- If you click and keep the mouse button pressed, you can adjust the position of the new hitpoint by dragging. Releasing the mouse button adds the hitpoint.

5. Audition the new slice with the Play tool to make sure you got what you wanted.

Moving hitpoints

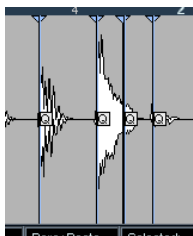
If you manually added a hitpoint, and it was either placed too far away from the start of the sound or too far into the sound, you can manually move the hitpoint. It is also possible to move calculated hitpoints this way.

1. Make sure Snap to Zero Crossing is activated on the Sample Editor toolbar.
2. Select the Hitpoint Edit tool.
3. Click on the hitpoint handle and drag it to the new position.

Deleting hitpoints

To delete a hitpoint, select the Hitpoint Edit tool and drag the hitpoint out of the Sample Editor window. Hitpoints that you have created manually can also be deleted by clicking their handle with the Hitpoint Edit tool.

About Q-points



Optionally, hitpoints can have individual Q-points. Their function is to define the point to which the quantizing will apply. Sometimes a slice might have a slow attack, and a peak further into the slice which you wish to use as the Q-point. This defines the point which will be stretched to a grid position when quantizing.

- To activate Q-points, open the Preferences dialog (Editing–Audio page) and activate the option “Hitpoints have Q-Points”.

Next time you use the Calculate Hitpoints function, the hitpoints will have Q-points. Manually added hitpoints do not have Q-points.

- To offset the position of a Q-point in relation to the hitpoint, simply click on the “Q” icon and drag it to the right to the desired position.

Creating slices

After you have specified the correct loop length and time signature and worked on the hitpoints in the Sample Editor so that one sound per slice is heard, it is time to actually slice the file (if that is what you want to do – there are other uses for hitpoints as well, as described below). This is done by selecting “Create Audio Slices from Hitpoints” from the Hitpoints submenu on the Audio menu.

The following happens:

- If you edited an event on an audio track, the Sample Editor closes.

- The audio event is “sliced” so that there is a separate event for each hitpoint.

In other words, the sections between the hitpoints become separate events, all referring to the same original file.

- On the audio track, the former audio event is replaced by an audio part that contains the slices.

If you edited a clip from the Pool, you need to drag it to an audio track to get a part with the slices.

⚠ When you create slices, all events containing the edited clip will also be replaced.

- The loop is automatically adapted to the tempo set in Cubase AI.

This takes the loop length you specified into account: e.g., if the loop was one bar long, the part is resized to fit exactly one bar in the Cubase AI tempo, and the slices are moved accordingly, keeping their relative positions within the part.

You can change the tempo and have the loop automatically follow. Furthermore, you can double-click the part to edit the slices in the Audio Part Editor to:

- Remove or mute slices.
- Change the loop by reordering, replacing or quantizing slices.
- Apply processing or effects to individual slices.
- Create new files from individual slices using the “Bounce Selection” function on the Audio menu.
- Realtime transpose and stretch slices.
- Edit slice envelopes.

Other hitpoint functions

On the various submenus on the Audio menu, you will also find the following functions:

Create Markers from Hitpoints

This is located on the Hitpoints submenu. If an audio event contains calculated hitpoints, this function can be used to add markers – one for each hitpoint – to an existing or automatically created marker track (see [“Using the Marker track”](#) on [page 72](#)). This can be useful for locating to hitpoints.

Divide Audio Events at Hitpoints

This Hitpoints submenu item can be used when you simply wish to create separate events according to the hitpoints for a file. This means that you do not have to make the same considerations as when slicing for tempo changes. You can use any method you like to set hitpoints, i.e. use sensitivity, note values, manually or any combination.

- The slices created will appear in the Project window as separate events.

Set Audio Event from Loop

This Advanced submenu function will resize the event according to the loop range in the Sample Editor.

Set Tempo from Event

This Advanced submenu function sets the project tempo according to the original tempo of the loop (as specified in the Sample Editor or in the Pool). The result depends on whether you are using a fixed tempo or the Tempo track.

- If you are using fixed tempo, you will be asked to confirm that you want to change this – click Yes to set the fixed tempo to the event's original tempo.
- If you are using the Tempo track, but there are no tempo changes, you will be asked whether the global tempo should be changed.

Click Yes to change the global tempo (the first tempo event on the Tempo track) or No to insert tempo events at the beginning and end of the audio event (i.e. the project tempo will be adapted to the loop tempo but only during the course of the event).

- If you are using the Tempo track with tempo changes, new tempo events will be inserted at the beginning and end of the audio event.

The project tempo will be adapted to the loop tempo during the course of the event.

Stretch to Project Tempo

This Advanced submenu function makes use of the original tempo and applies time stretch to the selected event, so that it fits the current project tempo.

This can be used for stretching a whole loop (not sliced) to the project tempo.

Close Gaps

If you have sliced a loop for tempo changes, lowering the tempo below the loop's original tempo will create gaps between the slices. The lower the tempo is in relation to the original tempo, the wider the gaps will be. This can be fixed using the “Close Gaps” function on the Advanced submenu:

1. Set the desired tempo.
2. Select the part in the Project window.
3. Select “Close Gaps” from the Advanced submenu. Now time stretch is applied on each slice to close the gaps. Depending on the length of the part, this can take a little while.
4. The waveform is redrawn and the gaps are closed!

- Note that this feature creates new clips in the Pool, one for each slice.

- Close Gaps can also be used when the project tempo is higher than the original loop tempo.

This will use the time stretch function to shrink the slices to fit.

- If you decide to change the tempo again after using the Close Gaps function, you should undo the Close Gaps operation or start over again, using the original unstretched file.

- You can also use this function on individual events (in the Audio Part Editor or Project window).

The events don't have to be slices – you can use Close Gaps simply to stretch an audio event to the start position of the next event.

16

The Pool

Background

What is the Pool?

Every time you record on an audio track, a file is created on your hard disk. A reference to this file – a clip – is also added to the Pool. Two general rules apply to the Pool:

- All audio and video clips that belong to a project are listed in the Pool.
- There is a separate Pool for every project.

The way the Pool displays folders and their contents is similar to the way the Mac OS X Finder and the Windows Explorer display folders and lists of files.

What can you do in the Pool?

In the Pool you can, among other things, perform the following operations:

Operations that affect files on disk

- Import clips (audio files can automatically be copied and/or converted).
- Convert file formats.
- Rename clips (this will also rename the referred files on disk).
- Delete clips (if you select the “Move to Trash” option and empty the Trash folder – see [“Deleting clips”](#) on [page 132](#)).
- Prepare File Archives for backup.
- Minimize files.

Operations that only affect clips

- Copy clips.
- Audition clips.
- Organize clips.
- Apply audio processing to clips.

Opening the Pool

You open the Pool in any of the following ways:

- By clicking the Pool icon in the Project window.



- By selecting “Pool” on the Project menu or “Open Pool Window” on the Media menu.
- By using a key command (by default [Ctrl]/[Command]+[P] – note that using this key command a second time will close the Pool again).

The content of the Pool is divided into three main folders:

- The Audio folder

This contains all audio clips currently in the project.

- The Video folder

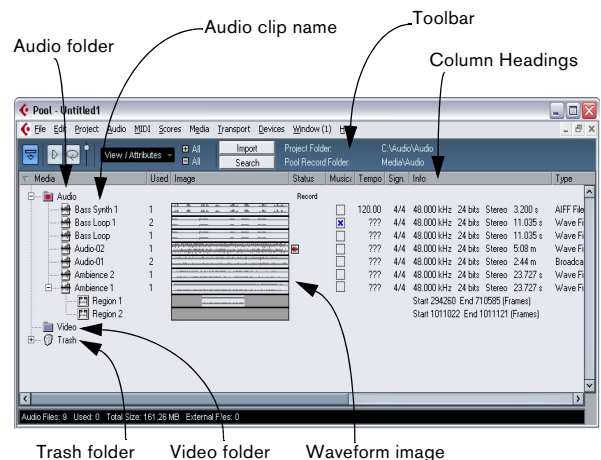
This contains all video clips currently in the project.

- The Trash folder

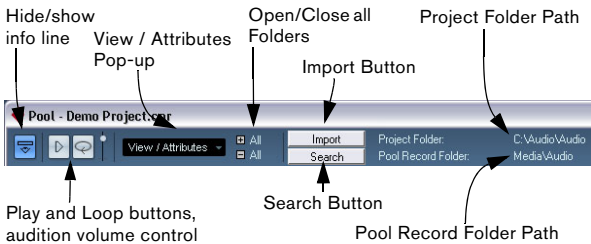
Unused clips can be moved to the Trash folder for later permanent removal from the hard disk.

These folders cannot be renamed or deleted from the Pool, but any number of subfolders can be added (see [“Organizing clips and folders”](#) on [page 137](#)).

Window Overview

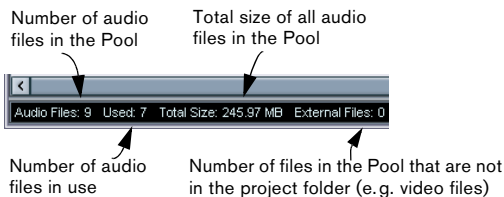


Toolbar overview



The info line

Click the “Show Info” button on the toolbar to show or hide the info line at the bottom of the Pool window. It shows the following information:

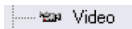


How clips are displayed in the Pool

- Audio clips are represented by a waveform icon followed by the clip name.



- Video clips are represented by a camera icon followed by the clip name.



The Pool window columns

Various information about the clips can be viewed in the Pool window columns. The columns contain the following information:

Column	Description
Media	This column contains the Audio, Video and Trash folders. If the folders are opened, the clip names are shown and can be edited. This column is always shown.
Used	This column displays the number of times a clip is used in the project. If a column row is empty, the corresponding clip is not used.

Column	Description
Status	This column displays various icons that relate to the current Pool and clip status. See “About the Status column symbols” on page 130 for a description of the icons.
Musical	The checkbox in this column allows you to activate or deactivate Musical Mode. If the Tempo column (see below) displays “???”, you have to enter the correct tempo before you can activate Musical Mode.
Tempo	This shows the tempo of audio files for which a tempo has been set using the Audio Tempo Definition tool. If no tempo has been specified, the column displays “???”.
Sign.	This is the time signature, e.g. “4/4”.
Info	This column shows the following information for audio clips: The sample rate, bit resolution, number of channels and the length in seconds. For video clips the frame rate, number of frames, and length in seconds are shown.
Type	This column shows the file format of the clip.
Date	This column shows the date when the clip was created.
Origin Time	This column shows the original start position where a clip was recorded in the project. As this value can be used as a basis for the option “Insert into Project” in the Media or context menu (and other functions), you can change it if the Origin Time value is independent.
Image	This column displays waveform images of audio clips.
Path	This column shows the path to the location of a clip on the hard disk.

About the Status column symbols

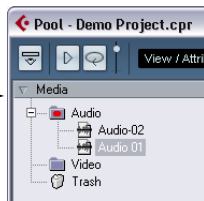
The Status column can display various symbols that relate to the clips status. The following symbols can be shown:

Symbol	Description
Record	This indicates the current Pool Record folder (see “Changing the Pool Record folder” on page 137).
	This symbol is shown if a clip has been processed.
?	The question mark indicates that a clip is referenced to the project but is missing from the Pool (see “About missing files” on page 134).
	This indicates that the clip file is external, i.e. located outside the current Audio folder for the project.
	This indicates that the clip has been recorded in the currently open version of the project. This is useful for finding recently recorded clips quickly.

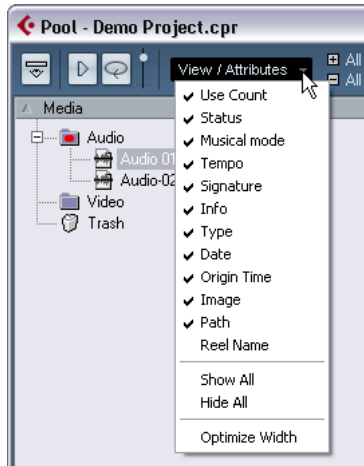
Sorting the Pool contents

You can sort the clips in the Pool by name, date etc. This is done by clicking on the corresponding column heading. Clicking again on the same heading switches between ascending and descending sort order.

The arrow indicates the sort column and sort order.



Customizing the view



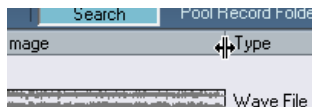
- You can specify which of the columns should be shown or hidden by selecting the View/Attributes pop-up on the toolbar and selecting/deselecting items.

- You can rearrange the order of the columns by clicking on a column heading and dragging the column to the left or right.

The mouse pointer changes to a hand when you place it on the column heading.

- The width of a column can also be adjusted by placing the pointer between two column headers and dragging left or right.

The pointer changes to a divider when you place it between two column headers.



Operations

Renaming clips in the Pool

To rename a clip in the Pool, select it and click on the existing name, type in a new name and press [Return].

⇒ This will also rename the referred files on disk!

⚠ Renaming a clip in the Pool is much preferred to renaming it outside Cubase AI (for example on the computer desktop). This way Cubase AI already “knows” about the change, and won’t lose track of the clip the next time you open the project. See [“About missing files”](#) on [page 134](#) for details about lost files.

Copying clips in the Pool

To make a duplicate clip, proceed as follows:

1. Select the clip you wish to copy.
2. Select “New Version” on the Media or context menu. A new version of the clip appears in the same Pool folder, with the same name but with a “version number” after it, to indicate that the new clip is a duplicate. The first copy made of a clip will logically get the version number “2” and so on.

⚠ Copying a clip does not create a new file on disk, but just a new edit version of the clip (referring to the same original file).

Inserting clips into a project

By using menus

1. Select the clip(s) you want to insert into the project.
2. Pull down the Media or context menu and select an “Insert into Project” option. The “At Cursor” option will insert the clip(s) at the current project cursor position. The “At Origin” option will insert the clip(s) at their Origin Time position(s).

- Note that the clip will be positioned so that its snap point is aligned with the selected insert position. You can also open the Sample Editor for a clip by double-clicking it, and perform the insert operation from there. This way you can set the snap point before inserting a clip.

3. The clip is inserted on the selected track or on a new audio track.

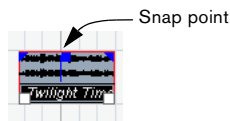
If several tracks are selected, the clip will be inserted on the first selected track.

By using drag and drop

You can use drag and drop to insert clips into the Project window. You can also use drag and drop from the Sample Editor for a clip by making a selection range and pressing [Ctrl]/[Command] while dragging. Note:

- Snap is taken into account if activated.
- While you drag the clip in the Project window, its position will be indicated by a marker line and a numerical position box.

Note that these indicate the position of the snap point in the clip. For example, if you drop the clip at the position 10.00, this will be where the snap point ends up. See ["Adjusting the snap point"](#) on [page 109](#) for information on how to set the snap point.



- If you position the clip in an empty area in the event display (i.e. below existing tracks), a new track is created for the inserted event.

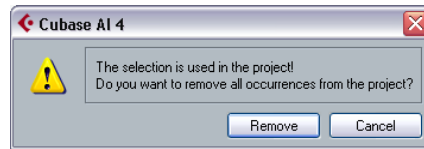
Deleting clips

Removing clips from the Pool

To remove a clip from the Pool without deleting it from the hard disk, proceed as follows:

1. Select the clip(s) and select "Delete" from the Edit menu (or press [Backspace] or [Delete]).

⇒ If you try to delete a clip that is used by one or more events, the program will ask you if you want to remove these events from the project.



If you cancel, neither the clip nor the associated events are deleted.

2. Click Remove.

A new prompt asks whether you want to move the clip to the Trash or remove it from the Pool.

3. Select "Remove from Pool".

The clip is no longer associated with the project, but still exists on the hard disk and can be used in other projects etc. This operation can be undone.

Deleting from the hard disk

To delete a file permanently from the hard disk, it must first be moved to the Trash folder:

1. Follow the instructions for deleting clips above and select "Trash".

Alternatively, you can drag and drop clips into the Trash folder.

2. Select "Empty Trash" on the Media or context menu. Choose one of the two options in the alert:

- Click "Erase" to delete the file on the hard disk permanently.

Remember that this operation cannot be undone!

⚠ Before you permanently delete audio files from the hard disk, make sure that they are not used by another project!

- Click "Remove from Pool" to remove the clip from the Pool but to keep the file.

⇒ To retrieve a clip from the Trash Folder, drag and drop it back into an Audio or Video folder.

Removing unused clips from the Pool

This function finds all clips in the Pool that are not used in the project. You can then decide whether to move them to the Pool Trash folder (where they can be permanently deleted) or to remove them from the Pool:

1. Select “Remove Unused Media” on the Media or context menu.
A prompt appears with the text “Move to Trash or Remove From Pool?”
2. Make your selection.

Locating events and clips

Locating events via clips in the Pool

If you want to find out which events in the project refer to a particular clip in the Pool, proceed as follows:

1. Select one or more clips in the Pool.
2. Select “Select in Project” on the Media or context menu.
All events that refer to the selected clip are now selected in the Project window.

Locating clips via events in the Project window

If you want to find the clip for an event in the Project window, proceed as follows:

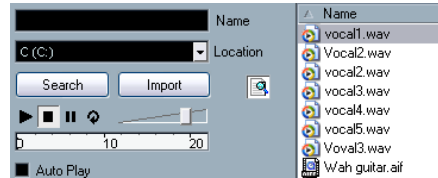
1. Select one or more events in the Project window.
2. Pull down the Audio menu and select “Find Selected in Pool”.

The corresponding clip(s) will be located and highlighted in the Pool. If the Pool window isn’t already open it will be opened.

Searching for audio files

The Pool can help you locate audio files in your Pool, on your hard disk or other media. This works much like the regular file search, but with a couple of extra features:

1. Click the Search button in the toolbar.
A search pane appears at the bottom of the window, displaying the search functions.



The search pane in the Pool.

By default, the search parameter in the search pane is “Name”. For using other filter criteria, see “[Extended search functionality](#)” on [page 134](#) below.

2. Specify the name of the file(s) to search for in the Name field.
You can use partial names or wildcards (*). Note that only audio files of the supported formats will be found.
3. Use the Location pop-up menu to specify where to search.
The pop-up menu will list all your local drives and removable media.
 - If you want to limit the search to certain folders, choose “Select Search Path” and select the desired folder in the dialog that appears.
The search will include the selected folder and all subfolders. Note also that folders you have recently selected using the “Select Search Path” function will appear on the pop-up menu, allowing you to quickly select any of them.

4. Click the Search button.
The search is started and the Search button is labeled Stop – click this to cancel the search if needed.

When the search is finished, the found files are listed to the right.

- To audition a file, select it in the list and use the playback controls to the left (Play, Stop, Pause and Loop).
If Auto Play is activated, selected files will automatically be played back.
 - To import a found file into the Pool, select it in the list and double-click it or click the Import button.
5. To close the search pane, click the Search button in the toolbar again.

The Find Media window

Alternatively to the search pane in the Pool, you can open a stand-alone Find Media window by selecting the “Search Media...” option from the Media or context menu (also available from the Project window). This offers the same functionality as the search pane.

- To insert a found clip directly into the project from the Find Media window, select it in the list in the dialog and select one of the “Insert into Project” options from the Media or context menu.

The options are described in [“Inserting clips into a project”](#) on [page 131](#).

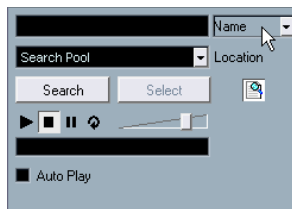
Extended search functionality

Apart from the search criterion Name, additional search filters are available. To use them, proceed as follows:

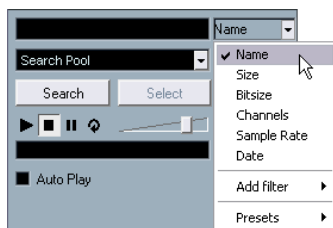
1. Click the Search button on the toolbar.

The Search pane is displayed in the lower part of the Pool window.

2. Move the mouse pointer over the “Name” text to the right of the name field, until an arrow is displayed, and click it.



Move the mouse pointer over the “Name” text to the right of the name field and click...



... to show the Extended Search pop-up menu.

3. The Extended Search pop-up menu opens.

This contains six options determining which search criteria will be displayed above the Location (Name, Size, Bitsize, Channels, Sample Rate or Date) and the Add Filter and Presets submenus.

The search criteria have the following parameters:

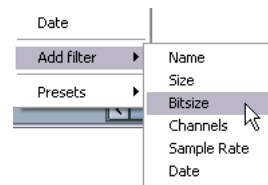
- Name: partial names or wildcards (*)
- Size: Less than, more than, equal, between (two values), in seconds, minutes, hours and bytes
- Bitsize (resolution): 8, 16, 24, 32
- Channels: mono, stereo and from 3 to 16
- Sample Rate: various values, choose “Other” for free setting
- Date: various search ranges

4. Select one of the topmost 6 options in the pop-up menu to change the search option above the Location pop-up menu.

This way, you can choose e.g. to display the Size or Sample Rate parameter instead of the Name field.

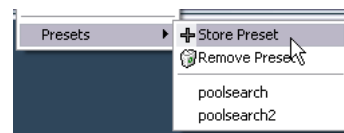
5. If you want to display more search options, select the desired element from the Add filter submenu.

This allows you e.g. to add the Size or the Sample Rate parameters to the already displayed Name and Location parameters.



This allows for a very detailed search, helping you to master even the largest sound database.

- You can store presets of your search filter settings. For this, click Store Presets in the Presets submenu and enter a name for the preset.



Existing presets will be offered at the bottom of the list. To remove a preset, click on the preset to activate it, then choose Remove Preset.

About missing files

When you open a project, the Resolve Missing Files dialog (see below) may open, warning you that one or more files are “missing”. If you click Close in the warning dialog, the project will open anyway, without the missing files. In the Pool you can check which files are considered missing. This is indicated by a question mark in the Status column.

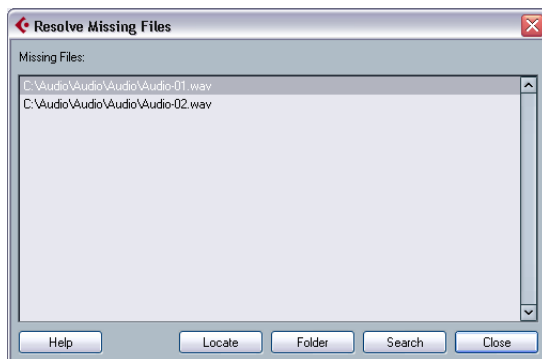
A file is considered missing under one of the following conditions:

- The file has been moved or renamed outside the program since the last time you worked with the project, and you ignored the Resolve Missing Files dialog when you opened the project for the current session.
- You have moved or renamed the file outside the program during the current session.
- You have moved or renamed the folder in which the missing files are located.

Locate missing files

1. Select “Find Missing Files” from the Media or context menu.

The Resolve Missing Files dialog opens.



2. Decide if you want the program to try to find the file for you (Search), if you want to do it yourself (Locate) or if you want to specify in which directory the program should search for the file (Folder).

- If you select Locate, a file dialog opens, allowing you to locate the file manually. Select the file and click “Open”.
- If you select Folder, a dialog opens to let you specify the directory in which the missing file can be found. This might be the preferred method if you have renamed or moved the folder containing the missing file, but the file still has the same name. Once you select the correct folder, the program finds the file and you can close the dialog.

- If you select Search, a dialog opens to let you specify which folder or disk should be scanned by the program. Click the Search Folder button, select a directory or a disk and click the Start button. If found, select the file from the list and click “Accept”. Afterwards Cubase AI tries to map all other missing files automatically.

Reconstructing missing edit files

If a missing file cannot be found (e.g. if you have accidentally deleted it from the hard disk), it will normally be indicated with a question mark in the Status column in the Pool. However, if the missing file is an edit file (a file created when you process audio, stored in the Edits folder within the project folder), it may be possible for the program to reconstruct it by recreating the editing to the original audio file:

1. Open the Pool and locate the clip(s) for which files are missing.
2. Check the Status column – if it says “Reconstructible”, the file can be reconstructed by Cubase AI.
3. Select the reconstructible clips and select “Reconstruct” from the Media or context menu. The editing is performed and the edit files are recreated.

Removing missing files from the Pool

If the Pool contains audio files that cannot be found or reconstructed, you may want to remove these. For this, select “Remove Missing Files” from the Media or context menu. This will remove all missing files from the Pool as well as their corresponding events from the Project window.

Auditioning clips in the Pool

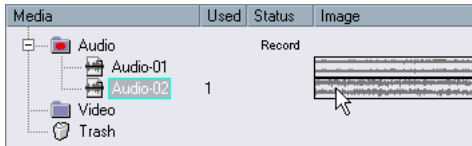
There are two methods you can use to audition clips in the Pool:

- By selecting a clip and activating the Play button. The whole clip will play back, unless you stop playback by clicking the Play button again.



The Play button.

- By clicking somewhere in the waveform image for a clip. The clip will play from the position in the waveform you click until the end of the clip, unless you stop playback by clicking the Play button, or by clicking anywhere else in the pool window.



Click in the waveform image to audition a clip.

You can adjust the auditioning level with the miniature level fader on the toolbar. This does not affect the regular playback level.

If you have activated the Loop button before you audition, the following will happen:



The Loop button.

- If you click the Play button to audition a clip, it will repeat indefinitely until you stop playback by clicking the Play or Loop button again.
- If you click in the waveform image to audition, the section from the point you clicked to the end of the clip will repeat indefinitely until you stop playback.

Opening clips in the Sample Editor

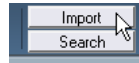
The Sample Editor allows you to perform detailed editing on the clip (see [“The Sample Editor”](#) on [page 105](#)).

If you double-click on a clip waveform icon or a clip name in the Media column, the clip will open in the Sample Editor.

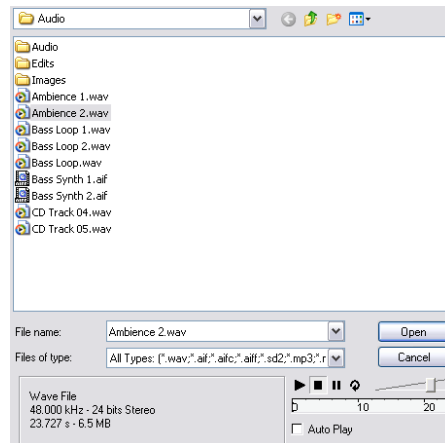
One practical use for this is to set a snap point for a clip (see [“Adjusting the snap point”](#) on [page 109](#)). When you later insert the clip from the Pool into the project, you can have it properly aligned according to the set snap point.

Import Medium...

The Import Medium dialog lets you import files directly into the Pool. It is opened from the Media or context menu or with the Import button in the Pool window.



Clicking the Import button opens the Import dialog:



This is a standard file dialog, where you can navigate to other folders, audition files etc. The following audio file formats can be imported:

- Wave
- AIFF and AIFC (Compressed AIFF)
- REX or REX 2 (see [“Importing ReCycle files”](#) on [page 241](#))
- SD2 (Sound Designer II)
- MPEG Layer 2 and Layer 3 (mp2 and mp3 files – see [“Importing compressed audio files”](#) on [page 242](#))
- Windows Media Audio (Windows – see [“Importing compressed audio files”](#) on [page 242](#))

They may have the following characteristics:

- Stereo or mono
- Any sample rate (although files with another sample rate than the one used in the project will play back at the wrong speed and pitch – see below).
- 8, 16, 24 bit or 32 bit float resolution

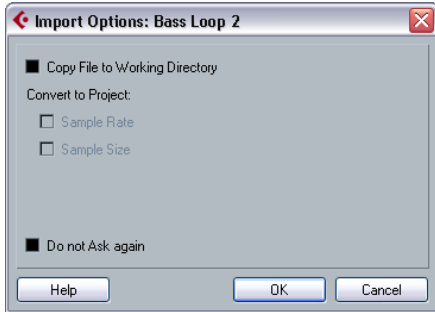
The following videos formats can also be imported:

- AVI (Audio Video Interleave)
- MOV and QT (QuickTime)
- DV (Mac OS X only)
- MPEG 1 and 2 video files

⚠ For video files to be played back correctly, the right codecs have to be installed.

⇒ It is also possible to use the commands on the Import submenu on the File menu to import audio or video files into the Pool.

When you select a file in the Import Medium dialog and click Open, the Import Options dialog opens:



It contains the following options:

- **Copy File to Working Directory.**

Activate this if you want a copy of the file to be made in the Audio folder of the project, and have the clip refer to this copy. If the option is off, the clip will refer to the original file in the original location (and will thus be marked as “external” in the Pool – see [“About the Status column symbols”](#) on [page 130](#)).

- **Convert to Project section:**

Here you can choose to convert:

- the sample rate (if the sample rate is different than the one set for the project)
- the sample size, i.e. resolution (if the sample size is lower than the record format used in the project)

The options are only available if necessary. Note that if you are importing several audio files at once, the Import Options dialog will instead contain a “Convert if needed” checkbox. When this is activated, the imported files will be converted only if the sample rate is different or the sample size is lower than the project’s.

- **Do not Ask again.**

If this is activated, files will always be imported according to the settings you have made, without this dialog appearing. This can be reset in the Preferences (Editing–Audio page).

⇒ You can always convert files later by using the Convert Files (see [“Convert Files”](#) on [page 139](#)) or Conform Files (see [“Conform Files”](#) on [page 139](#)) options.

Changing the Pool Record folder



The Pool Record folder.

In the Pool Record folder, all audio clips that you record in the project will end up. The Pool Record folder is indicated by the text “Record” in the Status column and by a red dot on the folder itself, as shown in the picture above. By default, this is the main Audio folder. You can, however, at any time create a new Audio subfolder and designate this as your Pool Record folder. Proceed as follows:

1. Select the Audio folder or any audio clip.

You cannot designate the Video folder (or a subfolder in it) as the Pool Record folder.

2. Select “Create Folder” on the Media or context menu. A new empty audio subfolder appears in the Pool.

3. Select the new folder.

4. Select “Set Pool Record Folder” on the Media or context menu, or click in the Status column of the new folder. The new folder now becomes the Pool Record folder, and any audio recorded in the project will be saved in this folder.

Organizing clips and folders

If you accumulate a large number of clips in the Pool, it may sometimes be difficult to quickly find specific items. In such cases, organizing clips in new subfolders with suitable names that reflect the content can be a solution. For example, you could put all sound effects in one folder, all lead vocals in another etc. Proceed as follows:

1. Select the type of folder, audio or video, for which you want to create a subfolder.

You cannot put audio clips in a video folder and vice versa.

2. Select “Create Folder” on the Media on context menu. A new empty subfolder named “New Folder” appears in the Pool.

3. Click on the name and enter an appropriate name for the folder.

4. Drag and drop the clips you wish to move to the new folder.

5. Repeat steps 1-4 as necessary.

Applying processing to clips in the Pool

You can apply audio processing to clips from within the Pool in the same way as to events in the Project window. Simply select the clip(s) and choose a processing method from the Audio menu. To find out more about audio processing, see [“Audio processing and functions” on page 99](#).

Undo processing

If you have applied processing to a clip, either in the Project window or in the Pool, this is indicated by the red and grey waveform symbol in the Status column.

Freeze Edits

You can use the Freeze Edits function to create a new file with processing applied or to replace the original with a processed version, see [“Freeze Edits” on page 104](#).

Minimize File

The option “Minimize File” on the Media or context menu allows you to change the size of audio files according to the audio clips referenced in a project. The files produced using this option will only contain the audio file portions actually used in the project. This can significantly reduce the size of the project, if large portions of the audio files are unused. Therefore, the option is useful for archiving purposes after you have completed a project.

⇒ This operation will permanently alter the selected audio files in the Pool. This cannot be undone!

If this is not what you want, you can use the option “Save Project to New Folder” in the File menu instead, see [“Save Project to New Folder” on page 239](#). This function also has the option of minimizing files, but copies all files into a new folder, leaving the original project untouched.

Proceed as follows:

1. Select the file(s) you wish to minimize in the Pool.
2. Select “Minimize File” on the Media or context menu.
An alert appears, informing you that the entire Edit History will be cleared. Click Minimize to proceed or Cancel to stop the process.
3. After the minimizing is finished, another alert appears, because the file references in the stored project have become invalid.
Click Save Now to save the updated project or click Later to proceed with the unsaved project.

Only the audio portions actually used in the project remain in the corresponding audio file(s) in the Pool Record folder.

Prepare Archive

The option “Prepare Archive” on the Media or context menu is useful if you want to archive a project. It checks that every clip referenced in the project is located in the same folder, and takes actions if that is not the case:

- Any files that are located outside the current project folder will be copied to it.

Please note that audio files that reside within the project folder will not be copied to the audio folder. You will therefore have to copy them there manually before backing up the audio folder or save them separately during backup, see below.

- If any processing has been applied, you will be asked whether you want to Freeze Edits.

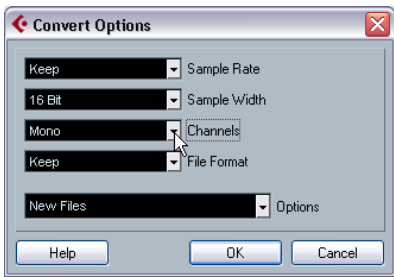
If you do this, you don't have to archive the Edits folder. Everything belonging to the project will be contained in the project file and the Audio folder.

Once you have performed a Prepare Archive, you can copy the project file, the Audio folder and any other audio material you saved in the project folder to backup disks, etc.

It is not necessary to archive the Images folder, since these Images can be recreated by Cubase AI. You may also find a file with the extension “.csh” in the project folder. This contains image information for edited clips and other data that can be recreated, so it can safely be deleted.

⚠ Video clips are always referenced and not stored in the project folder.

Convert Files



Selecting the option “Convert Files” on the Media or context menu opens the Convert Options dialog which operates on selected files. Use the pop-up menus to specify which audio file attributes you want to keep and which you want to convert. The available settings are:

- **Sample Rate**
Keep as is, or convert to a sample rate between 8.000 and 96.000 kHz.
- **Sample Width**
Keep the sample width (resolution) as is, or convert to 16 bit, 24 bit or 32 Bit float.
- **Channels**
Keep as is, or convert the file to Mono or Stereo Interleaved.
- **File Format**
Keep as is, or convert to Wave or AIFF format.

Options

When you convert a file, you can use the Options pop-up to set one of the following options regarding what to do with the new file:

Option	Description
New Files	Creates a copy of the file in the audio folder and converts this new file according to the chosen attributes. The new file is added to the Pool, but all clip references will still point to the original, unconverted file.
Replace Files	Converts the original file without changing clip references. The references are however saved with the next save action.
New + Replace in Pool	Creates a new copy with the chosen attributes, replaces the original file with the new one in the Pool and redirects the current clip references from the original file to the new file. This is the option to select if you want your audio clips to refer to the converted file, but still want to keep the original file on disk (e.g. if the file is used in other projects).

Conform Files

By using this Media or context menu command, you will change all selected files that have different file attributes than what is specified for the project, to conform to this standard.

Proceed as follows:

1. Select the clips in the Pool.
2. Select “Conform Files” on the Media or context menu. A dialog opens allowing you to choose between keeping or replacing the original unconverted files in the Pool. The following applies:
 - Clip/event references in the pool are always redirected to the conformed files.
 - If any 'keep' option is selected, original files remain in the Project's Audio folder and new files are created.
 - If you select the “Replace” option, files in the Pool and in the Project's Audio folder are replaced.

Introduction

As an alternative to the VSTi rack, instrument tracks provide a single MIDI input and a single stereo output in a compact combination of a MIDI track, a VST Instrument and a VST Instrument channel. They can be viewed as a track coupled with a sound.

Instrument tracks allow you to think more in terms of sounds rather than in instrument settings.

Instrument tracks also allow a much easier handling of VST Instruments because:

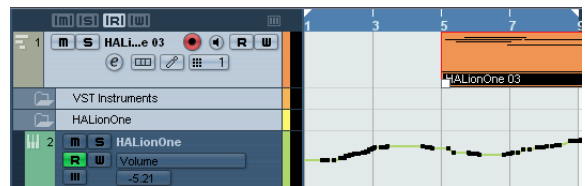
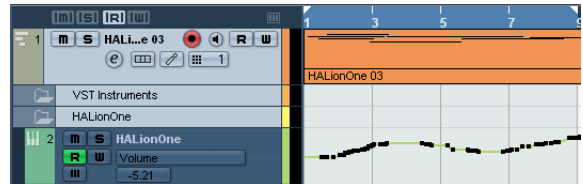
- One track corresponds to one channel in the mixer, which corresponds to one VST Instrument.
- The VST Instrument is set up automatically with the instrument track.
- All automation parameters are available directly in the instrument track. This way, you can move VST Instrument automation curves together with the MIDI data (see the example below).

Instrument tracks offer most of the editing possibilities and settings of VST Instruments and MIDI tracks – see the next sections for a comparison of properties and restrictions.

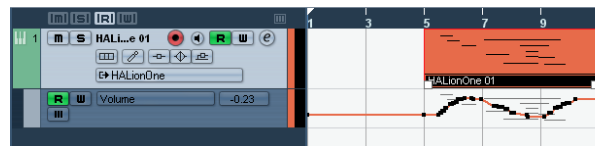
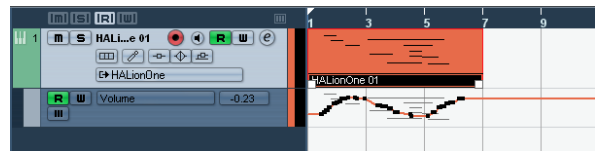
For more information about VST Instruments, see the separate pdf document “Plug-in Reference”.

“Normal” VST handling vs. instrument tracks

Usually, when you set up a VST Instrument in the VST Instrument window, you also create a MIDI track in which to enter the notes that you want the instrument to play. Although the two tracks are connected via the VST Instrument, you cannot, for example, automate the volume of the VST return channel directly in combination with the MIDI track. If you move the MIDI part, the automated volume of the VST return channel is not moved with it.



In the instrument track, however, you have one track that includes the MIDI data, the VST Instrument and the channel you wish to automate. Therefore, the automation data is moved with the MIDI part.



For more on the automation of MIDI and instrument tracks, see the chapter “Automation” on [page 89](#).

Since instrument tracks are a combination of MIDI and VST features, the instrument track properties and its handling show aspects of both, with certain differences.



On the left, the MIDI Inspector for a MIDI channel with its output routed to a VST Instrument – on the right, the instrument track Inspector for the same VST Instrument.

Properties

- Instrument tracks have most options that MIDI tracks have, e.g. MIDI Modifiers, and are automated in the same way.
- Instrument tracks have all options that VST Instrument channels have, i.e. Inserts, Sends, EQ, etc.
- Instrument tracks provide all the automation parameters of the (hidden) VST Instrument and the VST Instrument channel.

Restrictions

- MIDI volume and pan cannot be controlled (there is no “MIDI fader” section in the Inspector); instead, the VST Instrument volume and pan are used (via the “Channel” section in the Inspector). This applies also to the respective automation parameters.

⇒ Due to there being only one volume and pan control for the instrument track, the Mute button will mute the complete track, including the VST Instrument. (As opposed to a MIDI track with an assigned VST Instrument, for which muting the MIDI track still allows you to monitor and record the VST Instrument.)

- Instrument tracks always have one stereo output channel only. This means that VST Instruments that do not provide a stereo output as their first output channel cannot be used with instrument tracks.

- Due to the limit of one output channel, instrument tracks play only the first voice of multi-timbral VST Instruments. If you want to use all voices, you have to set up a MIDI channel in combination with the multi-timbral VST Instrument like in normal VST handling.

Conclusion

- The instrument track is the easiest application of a VST Instrument in a MIDI track. It is well-suited for automation.
- However, the instrument track is unsuited for instrument setups with multi-timbral instruments or for setups with incompatible restrictions, e.g. a MIDI device that never sends on the first channel or only has mono output. In cases like these, use a MIDI track.

Creating an instrument track

1. To add a track, either:

- Open the project menu, select the “Add Track” option and choose “Instrument”.
- Right-click in the track list to open the context menu and select “Add Instrument Track”.

2. In both cases, the Add Instrument Track dialog opens, providing a list of available VST Instruments.



- You can either select a VST Instrument from the list or proceed without specifying an instrument.
- If you want to add more than one instrument track, set the corresponding number in the count field.

3. Click OK to create the instrument track(s).



The new instrument track appears in the track list.

⇒ The VST Instrument is set up in the background, i.e. it does not appear in the VST Instruments window. However, you can get a complete overview of all currently used VST Instruments in the Plug-in Information window (for more information, see the separate pdf document “Plug-in Reference”).

Editing an instrument track/channel

According to the “mixed” nature of the instrument track, the features and parameters of VST Instruments as well as of MIDI tracks are available for editing:

- As with VST channels, you can solo and mute tracks or add, modify or bypass audio inserts and EQs etc. (For more information, see the separate pdf document “Plug-in Reference”).
- As with MIDI tracks, you can perform the usual MIDI editing procedures on the instrument track.
- As with MIDI track inspector and track controls, you can adjust track delay, choose the MIDI input, select drum maps, etc.

⇒ Although the routing of an instrument track is set to a certain VST Instrument, you can exchange the VST Instrument by clicking the output list in the Inspector and selecting a new one. All other settings remain unaffected by the change.

Exporting Instrument tracks

You can export instrument tracks as standard MIDI files, see [“Exporting MIDI files”](#) on [page 242](#).

Please note:

- As there is no MIDI patch information in an instrument track, this information is missing in the resulting MIDI file.
- If you activate “Export Inspector Volume/Pan”, the volume and pan of the VST Instrument channel are converted and written into the MIDI file as volume and pan controllers.

Introduction

For each MIDI track, you can set up a number of track parameters, or modifiers. These affect how the MIDI data is played back, “transforming” MIDI events in real time before they are sent to the MIDI outputs.

On the following pages, the available parameters and effects are described. Keep in mind:

- The actual MIDI events will not be affected – the changes happen “on the fly”.
- Since the modifier settings don’t actually change the MIDI data on the track, they will not be reflected in the MIDI editors. To convert the track settings to “real” MIDI events, use the Freeze MIDI Modifiers function (see “Permanent settings with Freeze MIDI Modifiers” on page 160).

The Inspector – General handling

The MIDI modifiers are set up in the Inspector. Here’s a brief rundown on how to handle the Inspector:

- To show or hide the Inspector, click the Inspector icon on the Project window’s toolbar.



- For a MIDI track, up to three sections are available, and all three sections are displayed by default.

For information about setting up the Inspector, see “The Setup dialogs” on page 245.

- You can fold or unfold the sections individually by clicking on the section name.

Clicking the name for a hidden section brings it to view and hides the other sections. [Ctrl]/[Command]-clicking the tab allows you to hide or show a section without affecting other sections. Finally, [Alt]/[Option]-clicking a tab shows or hides all sections in the Inspector.



The Inspector for a MIDI track.

⇒ Folding in or hiding (via the Setup dialog) a section does not affect the functionality but merely hides the section from view.

This means your settings will still be active even if you fold in or hide the Inspector settings.

Basic track settings

The topmost Inspector section contains the basic settings for the selected MIDI track.



These are settings that either affect the basic functionality for the track (mute, solo, enable record, etc.) or send out additional MIDI data to the connected devices (program change, volume, etc.). The section contains all settings in the Track list (see “The Track list” on page 16), with a few additional parameters:

Parameter	Description
Track name field	Click once to show/hide the topmost Inspector section. Double-click to rename the track.

Parameter	Description
Edit button	This opens the channel settings window for the track (a window showing a channel strip with volume fader and other controls – see “Using Channel Settings” on page 82).
Mute/Solo buttons	Mutes or solos the MIDI track.
Read/Write buttons	Used for automating the track settings – see “Using Write/Read automation” on page 93 .
Record enable button	Activate this to make the track ready for recording.
Monitor button	When this is activated (and the option “MIDI Thru Active” is on in the Preferences–MIDI page), incoming MIDI will be routed to the selected MIDI output.
Lane Display Type button	Allows you to divide the tracks in lanes.
Volume	Use this to adjust the level for the track. Changing this setting will move the track’s fader in the Mixer window, and vice versa. See “Setting volume in the mixer” on page 80 for more about setting levels.
Pan	Use this to adjust the panning of the track.
Delay	This adjusts the playback timing of the MIDI track. Positive values delay the playback while negative values cause the track to play earlier. The values are set in milliseconds.
Input/Output Routing/Channel	This is where you select MIDI input, MIDI output and MIDI channel for the track.
Edit Instrument button	If the MIDI track is routed to a VST instrument, clicking this button opens the control panel for the VST instrument.
Bank and Patch Selector pop-up	Allows you to select a sound, see below. (If no bank is available, only the Patch selector is shown.)
Drum Map	Allows you to select a drum map for the track – see “Managing drum maps” on page 187 .

⇒ Note that the functionality of the Bank and Patch selector settings (used for selecting sounds in the connected MIDI instrument) depends on to which instrument the MIDI output is routed, and how you have set it up in the MIDI Device Manager.

The MIDI Device Manager allows you to specify which MIDI instruments and other devices are connected to the various MIDI outputs, thus making it possible to select patches by name, see [“The MIDI Device Manager”](#) on [page 149](#).

⇒ Many of the basic track settings are duplicated in “mixer channel strip form” in the fader section of the Inspector (see below).

Other Inspector sections

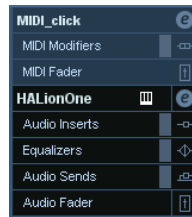
Apart from the basic track settings (see above) and the MIDI Modifiers (see [“MIDI Modifiers”](#) on [page 147](#)), the Inspector for a MIDI track also contains the following:

The MIDI Fader section

This contains a single channel strip, allowing you to set volume, pan, mute/solo and other parameters for the track. This is a “mirror” of the track’s channel strip in the mixer – see [“The MIDI channel strips”](#) on [page 79](#).

VST Instrument section

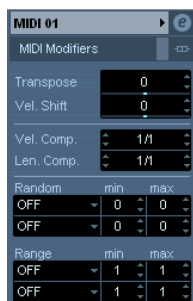
If the MIDI track is routed to a VST Instrument, a subpanel will appear at the bottom of the Inspector, labeled with the name of the VST instrument. Clicking this section shows a duplicate of the Inspector settings for the VST Instrument channel. This makes it easy to adjust the channel settings for the VST Instrument while you are editing the MIDI track.



- If the VST Instrument has multiple outputs (and thus several mixer channels), there will be a setting called “Output” at the top of the VST Instrument section.

⇒ For an easy way to combine MIDI and VST instruments, check out instrument tracks (see [“Instrument tracks”](#) on [page 140](#)).

MIDI Modifiers



The following settings will affect the MIDI events on the track in real time during playback. They will also be in effect if you play “live” with the track selected and record enabled (provided that “MIDI Thru Active” is activated on the Preferences–MIDI page). This makes it possible to transpose or adjust the velocity of your live playing.

⇒ If you want to compare the result of your modifier settings with the “unprocessed” MIDI, you can use the Bypass button in the MIDI Modifiers section.

When this is activated, the MIDI Modifiers settings will be temporarily disabled. A bypassed section is indicated by a yellow Bypass button.



Transpose

This allows you to transpose all notes on the track in semitones. The available range is -127 to +127 semitones, but remember that the total range of MIDI note numbers is 0 to 127. Furthermore, not all instruments can play back notes over the whole range. Therefore, extreme transpositions can give rather strange and unwanted results.

⇒ You can also transpose individual MIDI parts using the Transpose field in the info line.

The transposition in the info line (for the individual part) is added to the transpose value you have set up for the whole track in the Inspector.

Velocity Shift

This setting lets you change the dynamics of all notes on the track. The value in this field is added to the velocity of each note message that is sent out (use negative values to lower the velocities). The range is -127 to +127 with 0 representing no change in velocity.

Note that the effect of changing the velocity depends on the sound and instrument.

⇒ You can also adjust the velocity of events in individual MIDI parts using the Velocity field in the info line.

The velocity shift in the info line (for the individual part) is added to the velocity shift you have set up for the whole track in the Inspector.

Velocity Compression

This function multiplies the velocity values with the factor you specify. This factor is set using a numerator (left value) and a denominator (right value), resulting in a fractional number (1/2, 3/4, 3/2 etc.). For example, if you set the factor to 3/4, the velocities will be three quarters of their original values. This will also affect the difference in velocity between the notes, thus compressing or expanding the velocity scale. Typically, you would combine this setting with the Velocity Shift parameter. An example:

Let's say you have three notes with the velocity values 60, 90 and 120, and wish to “even out” the velocity differences somewhat. If you set the Velocity Compression value to 1/2, the notes will play back with the velocities 30, 45 and 60. By adding 60 in the Velocity Shift field, the notes will play back with the velocities 90, 105 and 120, meaning you have compressed the velocity range.

In a similar way, you can use Velocity Compression values greater than 1/1 together with negative values in the Velocity Shift field, to expand the velocity range.

⚠ Remember that the maximum velocity is always 127 no matter how much you try to expand.

Length Compression

This value adjusts the lengths of all notes on the track. As with Velocity Compression, the value is set with a numerator and denominator. For example, the value 2/1 means that all note lengths will be doubled, while 1/4 means all note lengths will be a quarter of the actual lengths.

Random

The Random settings let you introduce random variations to various properties of MIDI notes. Anything from very subtle variations to dramatic changes can be applied. There are two separate “random generators”, set up in the following way:

1. Pull down the Random pop-up menu and select which note property should be randomized.

The options are position, pitch, velocity and length.

⇒ Keep in mind that depending on the content of the track, certain parameter changes might not be immediately noticeable or have any effect at all (as would be the case if applying random length to a percussion track playing “one-shot” samples for example).

To best audition the random changes choose a track with clearly defined rhythm and note content (as opposed to a string pad).

2. Set the desired range of random deviation by entering values in the two number fields.

The two values govern the limits of the randomization, so that the values will vary between the left value and the right value (you cannot set the left value higher than the right value). The maximum random range for each property is listed in the table below:

Property	Range
Position	-500 to +500 ticks
Pitch	-120 to +120 semitones
Velocity	-120 to +120
Length	-500 to +500 ticks

⇒ Note that you can make independent settings for the two random generators.

- To deactivate the Random function, pull down the Random pop-up menu(s) and select “OFF”.

Range

The Range function lets you specify a note (pitch) or velocity range and either force all notes to fit within this range, or exclude all notes outside this range from playback. As with the Random function, there are two separate Range settings. Set them up as follows:

1. Pull down the Range pop-up menu and select one of the following four modes:

Mode	Description
Vel. Limit	This function affects all velocity values outside the specified range. Velocity values below the Min setting (the lower limit of the range) are set to the Min value, and velocity values above the Max setting are set to the Max value. Notes with velocity values within the set range are not affected. Use this if you want to force all velocity values to fit within a certain range.
Vel. Filter	Velocity Filter works by excluding all notes with velocity values outside the specified range. Notes with velocity values below the Min setting or above the Max setting will not be played back. Use this to “isolate” notes with certain velocity values.
Note Limit	This function allows you to specify a pitch range, and forces all notes to fit within this range. Notes outside the specified range are transposed up or down in octave steps until they fit within the range. Note: If the range is too “narrow”, so that some notes cannot be fit within the range by octave-transposing, these notes will get a pitch in the middle of the range. For example, if you have a note with a pitch of F3, and the range is C4-E4, that note will be transposed to D4.
Note Filter	Note Filter works by excluding all notes with pitches outside the specified range. Notes lower than the Min setting or higher than the Max setting will not be played back. Use this to “isolate” notes with certain pitches.

2. Use the two fields to the right to set the min and max values.

These values will be shown as numbers (0-127) for the velocity modes and as note numbers (C-2 to G8) for the pitch modes.

⇒ Note that you can make independent settings for the two Range functions.

- To deactivate the Range function, pull down the Range pop-up menu(s) and select “OFF”.

The MIDI Device Manager

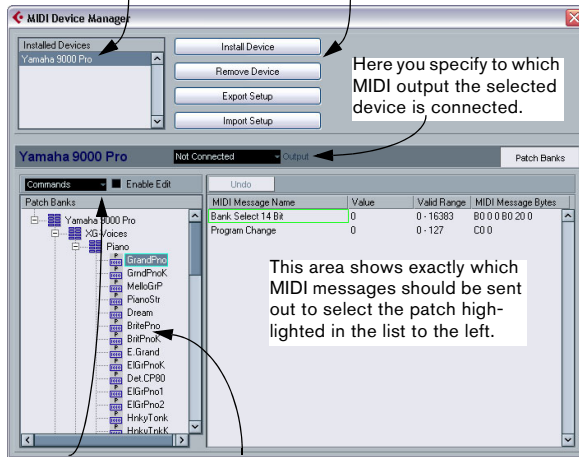
The MIDI Device Manager allows you to specify and set up your MIDI devices, making global control and patch selection easy.

Opening the MIDI Device Manager

Select MIDI Device Manager from the Devices menu to bring up the following window:

This is the list of MIDI devices you have connected. The first time you open the MIDI Device Manager, this list will be empty.

These buttons let you manage the list of installed devices.



Here you specify to which MIDI output the selected device is connected.

This area shows exactly which MIDI messages should be sent out to select the patch highlighted in the list to the left.

This pop-up menu lets you edit the selected device (provided that "Enable Edit" is activated).

Here, the patch structure is shown for the device selected above.

When you open the MIDI Device Manager for the first time, it will be empty (because you haven't installed any devices yet). On the following pages we describe how to add a pre-configured MIDI device to the list, how to edit the settings and how to define a device from scratch.

⇒ Note that there is an important difference between installing a preset MIDI device ("Install Device") and importing a MIDI device setup ("Import Setup"):

- The presets do not include any device mapping of parameters and controls.

They are simply patch name scripts. When you install a preset MIDI device, it is added to the Installed Devices list.

- A device setup can include device mapping and/or patch information.

Installing a MIDI device

To install a MIDI device, proceed as follows:

1. Click the Install Device button.

A dialog appears listing all pre-configured MIDI devices. For now we assume that your MIDI device is included in this list.

2. Locate and select the device in the list and click OK.

- If your MIDI device isn't included in the list but is compatible with the GM (General MIDI) or XG standards, you can select the generic GM or XG Device options.

When you select one of these options, a name dialog will appear. Enter a name for the instrument and click OK.

The device appears in the Installed Devices list to the left.

3. Select the new device in the list and pull down the Output pop-up menu.

4. Select the MIDI output that is connected to the device.

- You can rename a device in the Installed Devices list by double-clicking and typing – this is useful if you have several devices of the same model, and want to separate them by name instead of by number.

- To remove a device from the Installed Devices list, select it and click Remove Device. The device will be deleted immediately.

About Patch Banks

Depending on the selected device, you may find that the Patch Banks list is divided in two or more main banks.

Typically, these are called Patches, Performances, Drums etc. The reason for having several patch banks is that different "types" of patches are handled differently in the instruments. For example, while "patches" typically are "regular" programs that you play one at the time, "performances" may be combinations of patches, which could e.g. be split across the keyboard, layered or used for multitimbral playback.

For devices with several banks, you will find an additional button labeled "Bank Assignment" at the top of the window. Selecting this opens a window in which you can specify for each MIDI channel which bank it should use. The selection here will affect which bank is displayed when you select programs by name for the device in the track list or Inspector. For example, many instruments use MIDI channel 10 as an exclusive drum channel, in which case you would want to select the "Drums" (or "Rhythm

Set", "Percussion", etc.) bank for channel 10 in this list. This would then let you select between different drum kits in the track list or Inspector.

Selecting a patch for an installed device

If you return to the Project window at this point, you will find that the installed device has been added to the MIDI Output menus (in the track list and the Inspector). Now you can select patches by name, in the following way:

1. Pull down the Output menu (in the track list or Inspector) for a track that you want to play the installed device, and select the device.

This directs the track to the MIDI output specified for the device in the MIDI Device Manager. The bank and program fields in the track list and Inspector are replaced by a single Programs field that currently reads "Off".

2. Click the Programs field to display a pop-up menu, hierarchically listing all the patches in the device.

The list is similar to the one displayed in the MIDI Device Manager. You can scroll the list up and down (if required), click the plus/minus signs to show or hide subgroups, etc.

You can also use a filter function here. For this, enter the search term in the Filter field, e.g. "drum", and press [Return] to display all sounds with "drum" in the name.

3. Click a patch in the list to select it.

This sends the appropriate MIDI message to the device. You can also scroll the program selection up or down, as with any value.

Renaming patches in a device

The pre-configured devices list is based on the factory-preset patches, i.e. the patches included in the device when you first bought it. If you have replaced some of the presets with your own patches, you need to modify the device so that the patch name list matches the actual device:

1. In the MIDI Device Manager, select the device in the Installed Devices list.
2. Activate the Enable Edit checkbox.
When this is turned off, you cannot edit the pre-configured devices.
3. Use the Patch Banks display to locate and select the patch you want to rename.
In many instruments, the user-editable patches are located in a separate group or bank.
4. Click on the selected patch in the Patch Banks list to edit its name.
5. Type in the new name and click OK.

6. Rename the desired patches in this way, and finish by deactivating Enable Edit again (to avoid modifying the device by accident).

⇒ You can also make more radical changes to the patch structure in a device (adding or deleting patches, groups or banks), see below.

For example, this would be useful if you expanded your MIDI device by adding extra storage media such as RAM cards, etc.

Patch Structure

Patches are structured as follows:

- Banks are the main categories of sounds – typically patches, performances and drums, as described above.
- Each bank can contain any number of groups, represented by folders in the list.
- The individual patches, performances or drum kits are represented by presets in the list.

The Commands pop-up menu contains the following items:

Create Bank

Creates a new bank at the highest hierarchical level of the Patch Banks list. You can rename this by clicking on it and typing a new name.

New Folder

Creates a new subfolder in the selected bank or folder. This could correspond to a group of patches in the MIDI device, or just be a way for you to categorize sounds, etc. When you select this item, a name dialog will appear, allowing you to name the folder. You can also rename the folder afterwards by clicking it and typing in the list.

New Preset

This adds a new preset in the selected bank or folder. You can rename the preset by clicking it and typing a new name.

When the preset is selected, its corresponding MIDI events (Program Change, Bank Select, etc.) are shown in the event display to the right. The default setting for a new preset is Program Change 0 – to change this, use the following procedures:

- ⚠ For details on which MIDI events are used for selecting patches in the MIDI device, consult its documentation.

- To change which Program Change value should be sent out to select the patch, adjust the number in the Value column for the Program Change event.
- To add another MIDI event (e.g. Bank Select) click directly below the last event in the list and select a new event from the pop-up menu that appears.
After adding a new event, you need to set its value in the Value column, as with Program Change.
- To replace an event, click on it and select another event from the pop-up menu.
For example, a MIDI device may require that a Bank Select message is sent first, followed by a Program Change message, in which case you would need to replace the default Program Change message with a Bank Select message and add a new Program Change after that.
- To remove an event, select it and press [Delete] or [Backspace].

⚠ Different devices use different schemes for Bank Select. When you insert a Bank Select event, you should check the device's documentation to find whether to choose "CC: BankSelect MSB", "Bank Select 14 Bit", "Bank Select 14 Bit MSB-LSB Swapped" or possibly some other option.

Add Multiple Presets

This opens a dialog, allowing you to set up a range of presets to be added in the selected bank or folder. Proceed as follows:

1. Add the event types required for selecting a patch in the MIDI device.

This is done just as when editing the settings for a single event: clicking in the event display brings up a pop-up menu from which you can select an event type.

2. Use the Range column to set up either a fixed value or a range of values for each event type in the list.

This requires some explanation:

If you specify a single value in the Range column (e.g. 3, 15 or 127), all added presets will have an event of this type set to the same value.

If you instead specify a value range (a start value and an end value, separated by a dash, e.g. 0-63), the first added preset will have an event set to the start value, the next value will be incrementally raised by one and so on, up to and including the end value.

⇒ The number of added presets depends on the Range setting.

3. Specify a Default Name below the event display.

The added events will get this name, followed by a number. You can rename presets manually in the Patch Banks list later.

4. Click OK.

A number of new presets are now added in the selected bank or folder, according to your settings.

Other editing functions

- You can move presets between banks and folders by dragging them in the Patch Banks list.
- You can remove a bank, folder or preset by selecting it in the Patch Banks list and pressing [Backspace].
- If you specify more than one bank, a Bank Assignment item will be added to the pop-up menu at the top of the window. Use this to assign banks to the different MIDI channels (see ["About Patch Banks"](#) on [page 149](#)).

Defining a new MIDI device

This section describes how to define a new MIDI device.

If your MIDI device is not included in the list of pre-configured devices (and is not a "plain" GM or XG device), you need to define it manually to make it possible to select patches by name.

1. In the MIDI Device Manager, click the Install Device button.

The Add MIDI Device dialog appears.

2. Select "Define New..." and click OK.

A dialog appears.

3. Enter the name of the device and the MIDI channels you would like the device to use and click OK.

The device appears in the Installed Devices list.

4. Select the device in the list.

As you can see, it currently contains only an Empty Bank item.

5. Make sure the Enable Edit checkbox is activated.

Now you can use the functions on the Commands pop-up menu to the left to organize the patch structure of the new device.

About Studio Connections

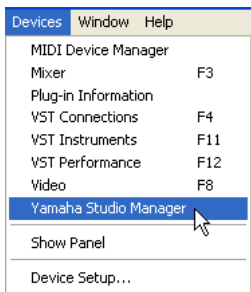
Studio Connections is the name of an initiative led by Steinberg and Yamaha. The initiative intends to create industry standards for totally integrated system environments using software and hardware products.

First implementation stage of the Studio Connections open standard is the integration and support of Yamaha's Studio Manager 2 (SM2) and Total Recall for compatible hardware devices.



For further information about Studio Connections, please visit the website <http://www.studioconnections.org>.

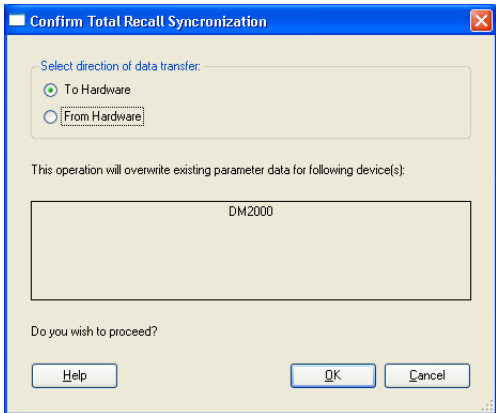
If you have a SM2 component installed, there is an additional menu item in the Devices menu.



Total Recall

Total Recall means that you can save and recall all settings of your hardware and software products by opening one integrated file in a DAW such as Cubase or Nuendo. Also you will have instant and organized access to hardware editors.

When you load a project or switch to another active project that contains SM2 data, the Total Recall Synchronization dialog appears:

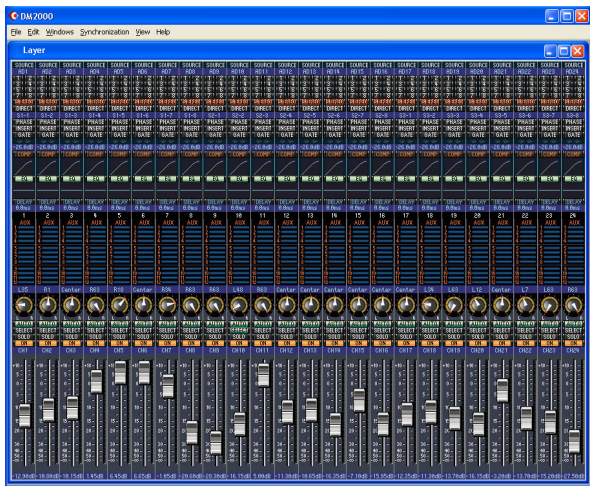


This dialog can also be opened any time from the Studio Manager's Synchronize menu. Click OK for the Dump to start.

Virtual MIDI Devices

If you have a new OPT component (e.g. the DM2000) which uses a new special interface, you can access these components as virtual MIDI Devices in the MIDI track's output routing (if the output of the OPT is configured).

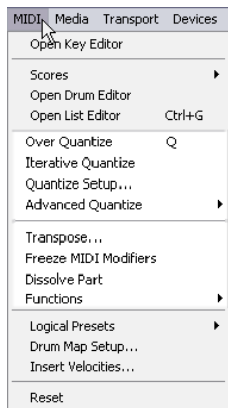
When a MIDI Track is routed to such a device, the “Open Device Panels” button becomes available. Click this button to open the editor window for the device.



⇒ Please also refer to the separate documentation for the Studio Manager 2 and the OPT components.

Introduction

This chapter describes the various MIDI processing functions available on the MIDI menu (see highlighted entries below). They offer various ways to edit MIDI notes and other events, either in the Project window or from within a MIDI editor.



MIDI functions vs. MIDI modifiers

There are MIDI functions that have no MIDI modifiers counterpart, and vice versa.

In some cases, however, the result of a MIDI function can also be obtained by using MIDI modifiers. For example, the operations “Transpose” and “Quantize” are available as MIDI modifiers as well as MIDI functions. The main difference is that MIDI modifiers don’t affect the actual MIDI events on the track in any way, while MIDI functions change the events “permanently” (although recent changes can be undone).

Use the following guidelines to decide which path to choose for operations that are available both as modifiers and as functions:

- If you want to adjust a few parts or events only, use MIDI functions. The MIDI modifiers affect the output of the whole track.
- If you want to experiment with different settings, use MIDI modifiers.

- MIDI modifiers settings are not reflected in the MIDI editors, since the actual MIDI events aren’t affected. This can be potentially confusing; if you’ve e.g. transposed notes using modifiers, the MIDI editors will still show the notes with their original pitch (but they will play back at their transposed pitch). Therefore MIDI functions are a better solution if you want to see the effects in the MIDI editors.

What is affected by the MIDI functions?

Which events are affected when you use a MIDI function depends on the function, the active window and the current selection:

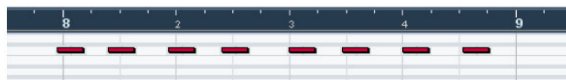
- A MIDI function may only apply to MIDI events of a certain type. For example, quantization affects notes only, while the Delete Controllers function obviously applies to MIDI controller events.
- In the Project window, the MIDI functions apply to all selected parts, affecting all events (of the relevant types) in them.
- In the MIDI editors, the MIDI functions apply to all selected events. If no events are selected, all events in the edited part(s) will be affected.

The Quantizing functions

What is quantizing?

Quantizing in its fundamental form is a function that automatically moves recorded notes, positioning them on exact note values:

For example, if you record a series of eighth notes, some of them may end up slightly beside the exact eighth note positions.



Quantizing the notes with the quantize grid set to eighth notes will move the “misplaced” notes to exact positions.



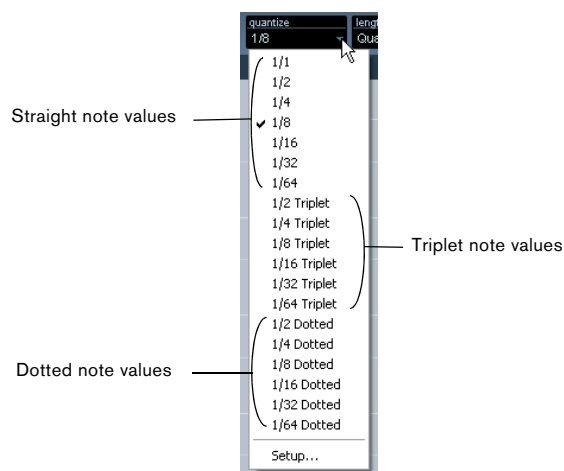
However, quantizing is not only a method of correcting errors, it can also be used creatively in various ways. For example, the “quantize grid” does not have to consist of perfectly straight notes, some notes can automatically be excluded from quantizing, etc.

⇒ When quantizing MIDI, only MIDI notes are affected (no other event types).

However, you can choose to move the controllers together with their respective notes by activating the “Move Controller” option in the Quantize Setup dialog, see [“The Move Controller setting”](#) on page 158.

Setting up quantize on the toolbar

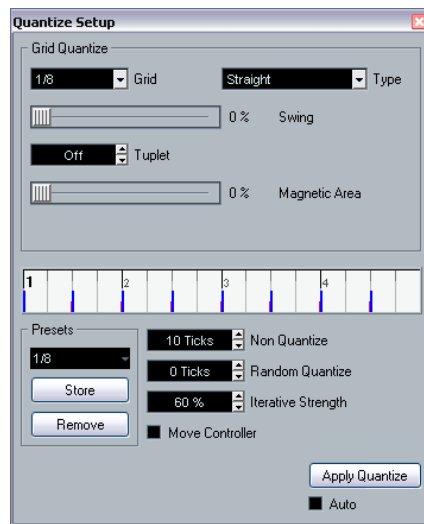
At its most basic, setting up quantizing consists of selecting a note value from the Quantize pop-up menu on the toolbar (in the Project window or a MIDI editor).



By default, this allows you to quantize to exact note values (straight, triplet or dotted notes) only.

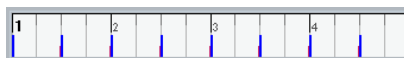
Setting up quantize in the Quantize Setup dialog

If you want more options than those available on the pop-up menu, select “Quantize Setup...” from the MIDI menu (or “Setup...” from the Quantize pop-up menu) to open the Quantize Setup dialog.



⚠ Any settings you make in the dialog are immediately reflected in the Quantize pop-up menus. However, if you want your settings permanently available on the Quantize pop-up menus, you have to use the presets functions (see [“Presets”](#) on page 157).

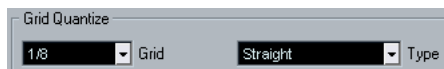
The grid display in the middle of the dialog shows one bar (four beats), with blue lines indicating the quantize grid (the positions that notes will be moved to). Value changes in the grid, presets and quantize options will be graphically reflected here, see below.



The Quantize Setup dialog contains the following settings:

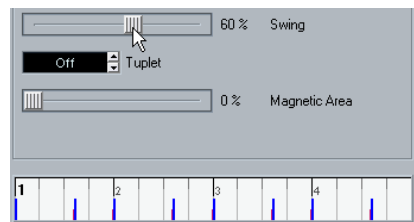
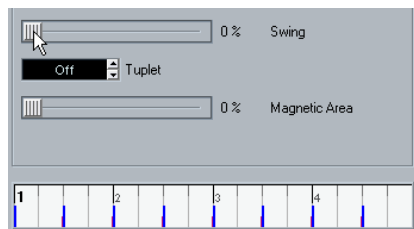
The Grid and Type pop-ups

These are used to determine the basic note value for the quantizing grid. In other words, these have the same functionality as the Quantize pop-up menu on the toolbar.



Swing

The Swing slider is only available when a straight note value is selected for the grid and Tuplet is off (see below). It lets you offset every second position in the grid, creating a swing or shuffle feel. When you adjust the Swing slider, the result is shown in the grid display.



A straight eighth note grid compared with a grid with 60% swing.

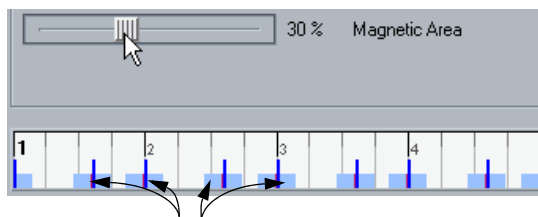
Tuplet

Allows you to create more rhythmically complex grids by dividing the grid into smaller steps.

Magnetic Area

This allows you to specify that only notes within a certain distance from the grid lines should be affected by quantizing.

- When the slider is set to 0%, the Magnetic Area function is deactivated, i.e. all notes are affected by quantizing. If you move the slider gradually to the right, you will note how the magnetic areas are shown around the blue lines in the grid display.



Only notes within the indicated zones will be affected by quantizing.

Presets

The controls in the lower left corner of the dialog allow you to store the current settings as a preset, available on the Quantize menus in the toolbars. The usual preset procedures apply:

- To store the settings as a preset, click the Store button.
- To “load” a stored preset, showing the stored settings in the dialog, just select it from the pop-up menu. This is useful if you want to modify an existing preset.
- To rename the selected preset, double-click on the name and type in a new one.
- To remove a stored preset, select it from the pop-up menu and click Remove.

Apply and Auto

These functions allow you to apply quantizing directly from the dialog, as described below.

- ⚠ If you don't want to apply the quantizing you have set up in the dialog, you can close the window by clicking its standard close box. You can also leave the dialog open while you continue working.

The Non Quantize setting

This is an additional setting that affects the result of the quantizing. It allows you to set a “distance” in ticks (120ths of sixteenth notes).



Events that already are within the specified distance from the quantize grid will not be quantized. This allows you to keep slight variations when you quantize, but still correct notes that are too far from the grid.

The Random Quantize setting

This is an additional setting that affects the result of the quantizing. It allows you to set a “distance” in ticks (120ths of sixteenth notes).

Events will be quantized to random positions within the specified “distance” from the quantize grid, thus creating a more “loose” quantizing. Much like the Non Quantize setting, this allows for slight variations, while at the same time keeping notes from ending up too far from the grid.

The Iterative Strength setting

Here you specify how much the notes should be moved towards the grid when using the Iterative Quantize function, see below.

The Move Controller setting

When this is activated, controllers related to notes (pitch bend, etc.) are automatically moved with the notes when these are quantized.

Applying quantize

There are several ways to apply the quantize:

- The standard method is to select “Over Quantize” from the MIDI menu (or using a key command, [Q] by default). This quantizes the selected MIDI parts or notes according to the current Quantize pop-up menu setting.
- You can also apply quantizing directly from the Quantize Setup dialog, by clicking the “Apply Quantize” button.
- If you activate the “Auto” checkbox in the Quantize Setup dialog, any change you make in the dialog is immediately applied to the selected MIDI parts or notes.

A great way of using this feature is to set up a playback loop, and adjust the settings in the dialog until you get the desired result.

⚠ When you apply quantize, the result is based on the original position of the notes. Therefore, you can freely try different quantize settings with no risk of “destroying” anything. See also [“Undo Quantize” on page 159](#).

The Auto Quantize function

If you activate the Auto Q button on the Transport panel, all MIDI recordings you make are automatically quantized according to the settings you have made in the Quantize Setup dialog.

Iterative Quantize

Another way to apply “loose” quantization is to use the Iterative Quantize function on the MIDI menu. It works like this:

Instead of moving a note to the closest quantize grid position, Iterative Quantize moves it only part of the way. You specify how much the notes should be moved towards the grid with the “Iterative Strength” setting in the Quantize Setup dialog.

Iterative Quantize also differs from “regular” quantization in that the operation is not based on the notes' original positions but on their current, quantized position. This makes it possible to repeatedly use Iterative Quantize, gradually moving the notes closer to the quantize grid until you've found the desired timing.

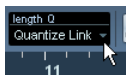


Advanced Quantize functions

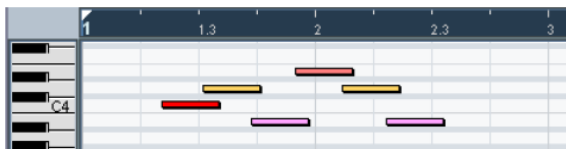
Quantize Lengths

⚠ This function is only available from within the MIDI editors.

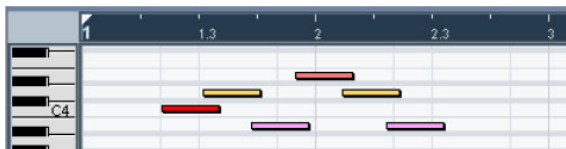
This function (on the Advanced Quantize submenu on the MIDI menu) will quantize the length of the notes, without changing their start positions. At its most basic level, this function will set the length of the notes to the Length Quantize value on the MIDI editors' toolbar. However, if you have selected the "Quantize Link" option on the Length Quantize pop-up menu, the function will resize the note according to the quantize grid, taking the Swing, Tuplet and Magnetic Area settings into account. An example:



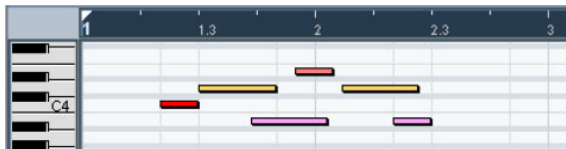
1. Length Quantize set to "Quantize Link".



2. Some 1/16th notes.



3. Here, the quantize value has been set to straight 1/16th notes with Swing at 100%. Since Snap is activated (see "Snap" on page 171), the quantize grid is reflected in the note display's grid.



4. Selecting Quantize Lengths will adjust the note lengths according to the grid. If you compare the result to the first figure above, you will find that notes that started within the odd sixteenth note "zones" show the longer grid length, and notes in the even zones have the shorter length.

Quantize Ends

The Quantize Ends function on the Advanced Quantize submenu will only affect the end positions of notes. Apart from that, it works just like regular quantizing, taking the Quantize pop-up menu setting into account.

Undo Quantize

As mentioned above, the original position of each quantized note is stored. Therefore, you can make the selected MIDI notes revert to their original, unquantized state at any time by selecting Undo Quantize from the Advanced Quantize submenu. This is independent from the regular Undo History.

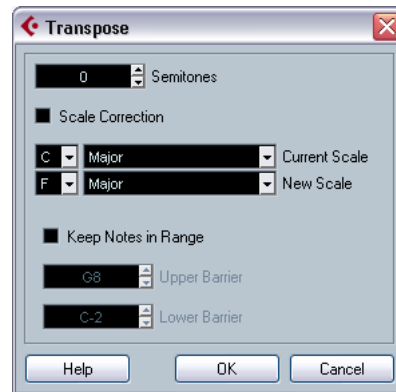
Freeze Quantize

There may be situations when you want to make the quantized positions "permanent". For example, you may want to quantize notes a second time, having the results based on the current quantized positions rather than the original positions. To make this possible, select the notes in question and select "Freeze Quantize" from the Advanced Quantize submenu. This makes the quantized positions permanent.

⚠ After you have performed a Freeze Quantize for a note, you cannot undo its quantization.

Transpose

The Transpose item on the MIDI menu opens a dialog with settings for transposing the selected notes:



Semitones

This is where you set the amount of transposition.

Scale Correction

Scale Correction transposes the selected notes by forcing them to the closest note of the selected scale type. This can be used for creating interesting key and tonal changes, either by itself or in conjunction with the other settings in the Transpose dialog.

- To activate Scale Correction, click the checkbox.
- Select a root note and scale type for the current scale from the upper pop-up menus.
- Select a root note and scale type for the new scale from the lower pop-up menus.

Make sure to select the correct root note if you want to keep the result in the same key as the original notes, or select an entirely different key if you want to experiment.

Keep Notes in Range

When this checkbox is activated, transposed notes will remain within the Upper and Lower Barrier values.

- If a note ends up outside the barriers after transposition, it will be shifted to another octave, keeping the correct transposed pitch if possible.

If this isn't possible (if you have set a very narrow range between the Upper and Lower Barrier), the note will be transposed "as far as possible", i.e. to the Upper or Lower Barrier note. If you set the Upper and Lower Barriers to the same value, all notes will be transposed to this pitch!

OK and Cancel

Clicking OK performs the transposition. Clicking Cancel closes the dialog without transposing.

Permanent settings with Freeze MIDI Modifiers

The MIDI Modifier settings in the Inspector do not change the MIDI events themselves, but work like a "filter", affecting the music on playback. Therefore, you may want to make them permanent, i.e. convert them to "real" MIDI events, for example to transpose a track and then edit the transposed notes in a MIDI editor. For this, you can use the "Freeze MIDI Modifiers" command from the MIDI menu. This applies all filter settings permanently to the respective track.

The "Freeze MIDI Modifiers" function affects the following settings for MIDI tracks:

- Several settings on the main tab of the Inspector (program and bank selection and the Delay parameter).
- The settings on the MIDI Modifiers tab (i.e. Transpose, Velocity Shift, Velocity Compression and Length Compression).

The following settings for MIDI parts are taken into account as well:

- The Transpose and Velocity settings for parts displayed on the info line – please note that the Volume setting is not taken into account.

To use the "Freeze MIDI Modifiers" function, proceed as follows:

1. Select the desired MIDI track.
2. Pull down the MIDI menu and select "Freeze MIDI Modifiers".

The Inspector settings will be converted to MIDI events and inserted at the beginning of the part(s). All notes of the part(s) will be modified accordingly and the Inspector settings will be reset.

Dissolve Part

The Dissolve Part function on the MIDI menu has two separate uses:

- When you work with MIDI parts (on MIDI channel "Any") containing events on different MIDI channels.

Dissolve Part separates the events according to MIDI channel.

- When you want to separate MIDI events according to pitch.

A typical example would be drum and percussion tracks, where each pitch usually corresponds to a separate drum sound.

⇒ When dissolving a part into either separate channels or separate pitches, you can automatically remove the silent (empty) areas of the resulting parts by activating the "Optimized Display" checkbox in the Dissolve Part dialog.

Dissolving parts into separate channels

Setting a track to MIDI channel "Any" will cause each MIDI event to play back on its original MIDI channel, rather than a channel set for the whole track. There are two main situations when "Any" channel tracks are useful:

- When you record several MIDI channels at the same time.

You may for example have a MIDI keyboard with several keyboard zones, where each zone sends MIDI on a separate channel. Recording on an “Any” channel track allows you to play back the recording with different sounds for each zone (since the different MIDI notes play back on separate MIDI channels).

- When you have imported a MIDI file of Type 0.

MIDI files of Type 0 contain only one track, with notes on up to 16 different MIDI channels. If you were to set this track to a specific MIDI channel, all notes in the MIDI file would be played back with the same sound; setting the track to “Any” will cause the imported file to play back as intended.

The Dissolve Part function scans MIDI parts for events on different MIDI channels and distributes the events into new parts on new tracks, one for each MIDI channel found. This allows you to work with each musical part individually. Proceed as follows:

1. Select the part(s) containing MIDI data on different channels.
2. Select “Dissolve Part” from the MIDI menu.
3. In the dialog that appears, select the “Separate Channels” option.

Now, for each MIDI channel used in the selected part(s), a new MIDI track is created and set to the corresponding MIDI channel. Each event is then copied into the part on the track with the corresponding MIDI channel. Finally, the original part(s) are muted.

An example:

This part contains events on MIDI channel 1, 2 and 3.



Selecting “Dissolve Part” creates new parts on new tracks, set to channel 1, 2 and 3. Each new part contains only the events on the respective MIDI channel.



The original MIDI part is muted.

Dissolving parts into separate pitches

The Dissolve Part function can also scan MIDI parts for events of different pitches, and distribute the events into new parts on new tracks, one for each pitch. This is useful when the different pitches are not used in a regular melodic context, but rather for separating different sounds (e.g. MIDI drum tracks or sampler sound FX tracks). By dissolving such parts, you can work with each sound individually, on a separate track. Proceed as follows:

1. Select the part(s) containing MIDI data.
2. Select “Dissolve Part” from the MIDI menu.
3. In the dialog that appears, select the “Separate Pitches” option.

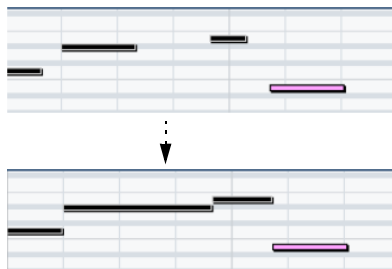
A new MIDI track is created for each used pitch in the selected part(s). The events are then copied into the parts on the track for the corresponding pitch. Finally, the original part(s) are muted.

Other MIDI functions

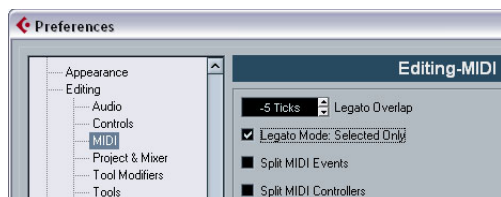
The following items can be found in the Functions sub-menu of the MIDI menu:

Legato

Extends each selected note so that it reaches the next note.



You can specify the desired gap or overlap with the “Legato Overlap” setting in the Preferences (Editing–MIDI page).



When using Legato with this setting, each note will be extended to end 5 ticks before the next note.

When you activate the “Legato Mode: Selected Only” option, the length of the note will be adjusted so that it reaches the next selected note, allowing you e.g. to only apply Legato to your bass line (when playing on a keyboard).

Fixed Lengths

⚠ This function is only available from within the MIDI editors.

This function resizes all selected notes to the length set with the Length Quantize pop-up menu on the MIDI editor toolbar.

Delete Doubles

This function removes double notes, i.e. notes of the same pitch on the exact same position. Double notes can occur when recording in Cycle mode, after Quantizing, etc.

⚠ This function always affects whole MIDI parts.

Delete Controllers

This function removes all MIDI controllers from the selected MIDI parts.

⚠ This function always affects whole MIDI parts.

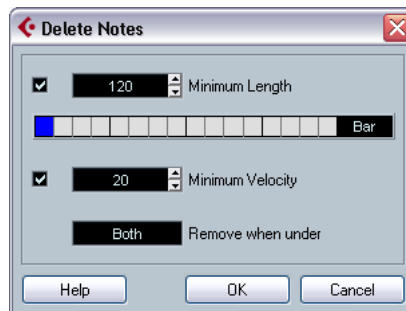
Delete Continuous Controllers

This function removes all “continuous” MIDI controller events from the selected MIDI parts. Therefore, “on/off” events such as sustain pedal events are not removed.

⚠ This function always affects whole MIDI parts.

Delete Notes

Allows you to delete very short or weak notes. This is useful for automatically removing unwanted “ghost notes” after recording. Selecting “Delete Notes...” opens a dialog in which you set up the criteria for the function:



The parameters have the following functionality:

Minimum Length

When the Minimum Length checkbox is activated, the note length is taken into account, allowing you to remove short notes. You can either specify the minimum length (for notes to be kept) in the value display or by dragging the blue line in the graphical length display below.

- The graphical length display can correspond to 1/4 bar, one bar, two bars or four bars.

You change this setting by clicking in the bar field to the right of the display.



In this case, the whole length display corresponds to two bars, and the Minimum Length is set to 1/32nd notes (60 ticks).

Minimum Velocity

When the Minimum Velocity checkbox is activated, the velocity of notes is taken into account, allowing you to remove weak notes. You specify the minimum velocity (for notes to be kept) in the value display.

Remove when under

This setting is only available when both Minimum Length and Minimum Velocity is activated. By clicking the value display, you select whether both length and velocity criteria must be met for notes to be deleted, or whether one of the criteria will suffice.

OK and Cancel

Clicking OK performs the automatic delete according to the rules set up. Clicking Cancel closes the dialog without deleting notes.

Restrict Polyphony

Selecting this item opens a dialog in which you can specify how many “voices” should be used (for the selected notes or parts). Restricting the polyphony this way is useful when you have an instrument with limited polyphony and want to make sure all notes will be played. The effect is achieved by shortening notes as required, so that they end before the next note starts.

Pedals to Note Length

This function scans for Sustain pedal on/off events, lengthens the affected notes to match the Sustain pedal off position, and then removes the Sustain Controller on/off events.

Delete Overlaps (mono)

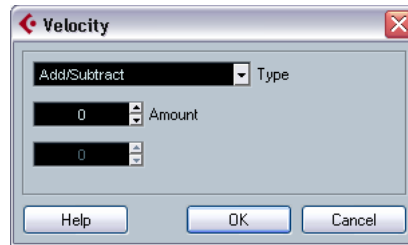
This function allows you to make sure that no notes of the same pitch overlap (i.e. that one starts before the other ends). Overlapping notes of the same pitch can confuse some MIDI instruments (a new Note On is transmitted before the Note Off is transmitted). This command can then be used to automatically solve the problem.

Delete Overlaps (poly)

This function shortens notes when required, so that no note begins before another ends. This happens regardless of which pitch the notes have.

Velocity

This function opens a dialog that allows you to manipulate the velocity of notes in various ways.



The following types of velocity processing are available:

Add/Subtract

This simply adds a fixed number to the existing velocity values. You set the value (positive or negative) with the Amount parameter.

Compress/Expand

Compresses or expands the “dynamic range” of MIDI notes by scaling the velocity values according to the Ratio setting (0 – 300%). The principle behind this is that multiplying different velocity values with a factor higher than 1 (over 100%) will also make the differences between velocity values greater, while using a factor lower than 1 (under 100%) will make the differences smaller. In short:

- To compress (“even out” velocity differences), use ratio values below 100%.

After compression, you would probably want to add a velocity amount (with the Add/Subtract function) to maintain the average velocity level.

- To expand (create greater difference in velocity), use ratio values above 100%.

Before you expand, you may want to adjust the velocity with the Add/Subtract function, so that the average velocity is somewhere in the middle of the range. If the average velocity is high (near 127) or low (near 0), expansion will not work properly, simply because velocity values can only be between 0 and 127!

Limit

This function allows you to make sure that no velocity values fall outside a given range (the Lower and Upper values). Any velocity values outside this range are raised/lowered to exactly the Lower/Upper values.

Fixed Velocity

This function sets the velocity of all selected notes to the Insert Velocity value on the toolbar in the MIDI editors.

Thin Out Data

Thins out MIDI data. Use this to ease the load on your external MIDI devices if you have recorded very dense controller curves etc.

You can also manually thin out the controller data by using the quantize function in the Key Editor.

Extract MIDI Automation

This option allows you to automatically convert continuous controller data of a MIDI part into MIDI track automation data. Proceed as follows:

1. Select the desired MIDI part containing the continuous controller data.
2. Select "Extract MIDI Automation". (This command is also available on the Key Editor context menu.)
The controller data will automatically be removed from the controller lane in the editor.
3. In the Project window, open the automation track(s) for the respective MIDI track (by clicking on the left edge of the track list or by selecting "Show All Used Automation" from the context menu). You will find that an automation track has been created for each of the continuous controllers in the part.

⇒ Please note that this function can only be used for continuous controllers. Data such as Aftertouch, Pitch-bend or SysEx cannot be converted to MIDI track automation data.

⚠ This is an extremely useful function as it allows you to quickly and easily convert the continuous controllers of your recorded MIDI parts into MIDI track automation data, making them available for editing in the Project window.

⇒ Remember that to be able to hear the automation data, you have to activate the Read button for the respective automation track(s).

Reverse

This function inverts the order of the selected events (or of all events in the selected parts), causing the MIDI music to play backwards. Note that the effect is different from reversing an audio recording. With MIDI, the individual notes will still play as usual in the MIDI instrument – it's only the order of playback that is changed.

20

The MIDI editors

About editing MIDI

There are several ways to edit MIDI in Cubase AI. You can use the tools and functions in the Project window for large-scale editing, or use the functions on the MIDI menu to process MIDI parts in various ways (see [“What is affected by the MIDI functions?”](#) on [page 155](#)). For hands-on graphical editing of the contents of MIDI parts, you use the MIDI editors:

- The Key Editor is the default MIDI editor, presenting notes graphically in an intuitive piano roll-style grid. The Key Editor also allows for detailed editing of non-note events such as MIDI controllers. For more information, see [“The Key Editor – Overview”](#) on [page 168](#).
- The Drum Editor is similar to the Key Editor, but takes advantage of the fact that with drum parts, each key corresponds to a separate drum sound. This is the editor to use when you’re editing drum or percussion parts. For more information, see [“The Drum Editor – Overview”](#) on [page 182](#).
- The List Editor shows all events in the selected MIDI parts as a list, allowing you to view and edit their properties numerically. For more information, see [“The List Editor – Overview”](#) on [page 189](#).
- The Score Editor shows MIDI notes as a musical score. This offers basic score editing and printing – see [“The Score Editor – Overview”](#) on [page 193](#) for details).

⇒ You can define each of the four editors mentioned above as your default MIDI editor, see below.

Opening a MIDI editor

There are two ways to open a MIDI editor:

- Select one or several parts (or a MIDI track, with no parts selected) and select Open Key Editor, Open Drum Editor, Open List Editor from the MIDI menu or Open Score Editor from the Scores submenu (or use the corresponding key command).

The selected parts (or all parts on the track, if no part was selected) will open in the chosen editor.

- Double-click a part to open it in the default editor.

Which editor opens depends on the settings in the Preferences (Event Display–MIDI page):



Double-clicking will open the editor selected on the Default Edit Action pop-up menu. However, if the option “Edit as Drums when Drum Map is assigned” is activated and a drum map is selected for the edited track (see [“Selecting a drum map for a track”](#) on [page 187](#)), the Drum Editor will open. This way you can double-click to open the Key Editor (or the Score Editor or List Editor, depending on your preferences) but drum tracks will automatically open in the Drum Editor.

⇒ If the part you open for editing is a shared copy, any editing you perform will affect all shared copies of this part. Shared copies are created by pressing [Alt]/[Option]+[Shift] and dragging, or by using the Repeat function with the “Shared copies” option activated. In the Project window, shared copies are indicated by the part name in italics and an icon in the bottom right corner of the part (see [“Duplicating events”](#) on [page 30](#)).

Handling several parts

When you open a MIDI editor with several parts (or a MIDI track containing several parts) selected, you might find it somewhat hard to get an overview of the different parts when editing.

For such cases the editor toolbar features a few functions to make working with multiple parts easier and more comprehensive:

- The Part List menu lists all parts that were selected when you opened the editor (or all parts on the track, if no parts were selected), and lets you select which part should be active for editing.

When you select a part from the list, it is automatically made active and centered in the note display.



⇒ Note that it is also possible to activate a part by selecting an event within this part with the Arrow tool.

- The button “Edit Active Part Only” lets you restrict editing operations to the active part only.

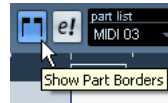
For example, if you select “All” from the Select submenu on the Edit menu with this option activated, only events in the active part will be selected. Similarly, if you select notes by dragging with the Arrow tool (making a selection rectangle), only the notes in the active part will be selected.



“Edit Active Part Only” activated on the toolbar.

- You can zoom in on the active part so that it fills the screen by selecting “Zoom to Event” from the Zoom submenu on the Edit menu.

- The button “Show Part Borders” can be used if you want to see clearly defined borders for the active part. When this is activated, all parts except the active one are grayed out, making the borders easily discernible. In the Key Editor, there are also two “markers” in the ruler with the name of the active part, marking its beginning and end. These can be moved freely to change the size of the part.

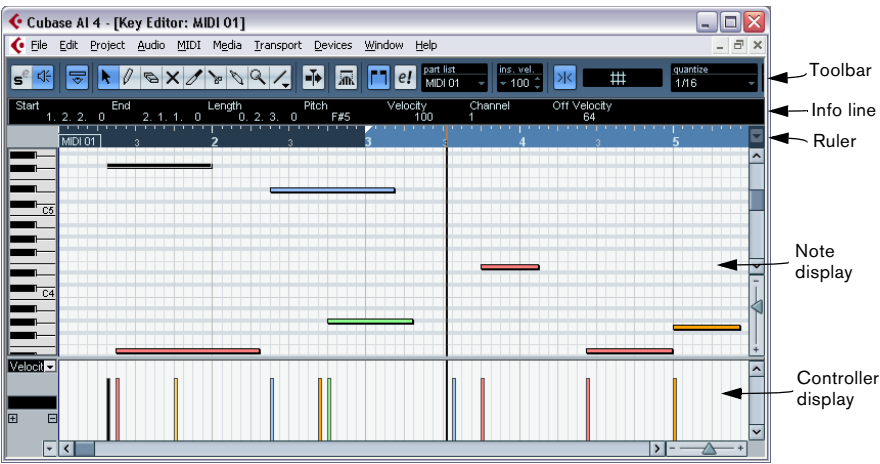


“Show Part Borders” activated on the toolbar.

- It is possible to cycle between parts (making them active) using key commands.

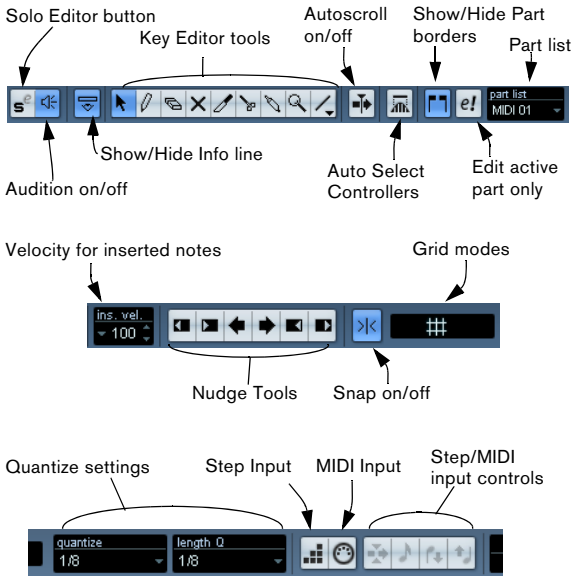
In the Key Commands dialog – Edit category, you will find two functions for this: “Activate Next Part” and “Activate Previous Part”. If you assign key commands to these, you can use them to cycle between parts in the editors. For further information, see [“Setting up key commands”](#) on [page 251](#).

The Key Editor – Overview



The toolbar

As in other windows, the toolbar contains tools and various settings. You can specify which toolbar items should be shown and store/recall different toolbar configurations – see “The Setup dialogs” on [page 245](#).



The info line

Start	End	Length	Pitch	Velocity	Channel
1. 2. 3. 56	1. 2. 1. 56	0. 0. 2. 0	A6	100	1

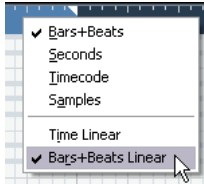
The info line shows information about selected MIDI notes. You can edit all values on the info line using regular value editing (see “[Editing on the info line](#)” on [page 176](#) for details). Length and position values are displayed in the format currently selected for the ruler (see below).

- To hide or show the info line, click the icon in the toolbar.

The ruler

The ruler shows the time line, by default in the display format selected on the Transport panel. You can select a separate format for a MIDI editor ruler on the Ruler pop-up menu, opened by clicking the arrow button to the right of it. For a list of the available formats, see “[The ruler](#)” on [page 20](#).

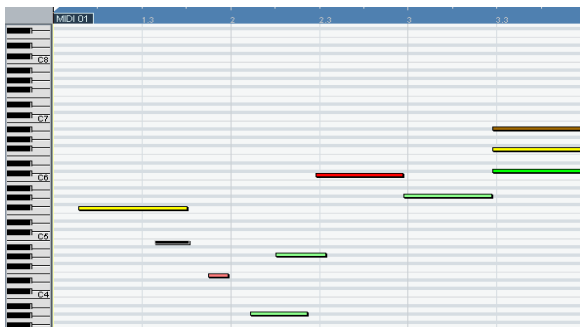
At the bottom of the pop-up menu, there are two additional items:



- If “Time Linear” is selected, the ruler, note display and controller display will be linear in relation to time. This means that if the ruler shows bars and beats, the distance between the bar lines will vary depending on the tempo.
- If “Bars+Beats Linear” is selected, the ruler, note display and controller display will be linear in relation to tempo. This means that if the ruler shows bars and beats, the distance between beats will be constant.

In most cases, you would probably set the display format to “Bars+Beats” in “Bars+Beats Linear” mode when editing MIDI.

The note display

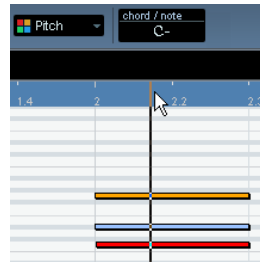


The note display is the main area in the Key Editor. It contains a grid in which MIDI notes are shown as boxes. The width of a box corresponds to the note length, and the vertical position of a box corresponds to the note number (pitch), with higher notes higher up in the grid. The piano keyboard to the left serves as a guide for finding the right note number.

For a description on how to display colors in the note display, see [“Coloring notes and events”](#) on [page 171](#).

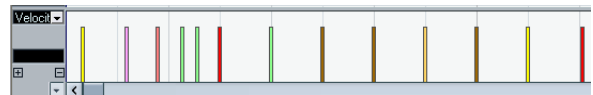
The chord recognition function

Cubase AI features a handy chord recognition function that helps you identify chords in the Key Editor note display. To find out which chord is formed by simultaneously played notes, place the project cursor over the notes. All MIDI notes currently “touched” by the project cursor are analyzed and the chord recognition display in the toolbar shows you which chord the notes form.



In the picture above, the project cursor touches the notes C, Eb and G. As shown in the chord recognition display, this results in a C minor chord.

The controller display

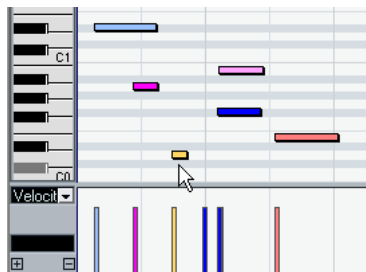


The area at the bottom of the Key Editor window is the controller display. This consists of one or several controller lanes, each showing one of the following properties or event types:

- Velocity values of the notes.
- Pitch Bend events.
- Aftertouch events.
- Poly Pressure events.
- Program Change events.
- Any type of continuous controller event.

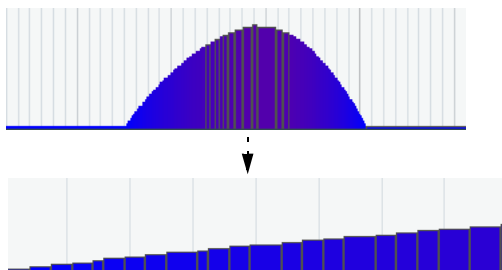
To change the size of the controller display, drag the divider between the controller display and the note display. This will make the controller display larger and the note display smaller, or vice versa.

Velocity values are shown as vertical bars in the controller display, with higher bars corresponding to higher velocity values:



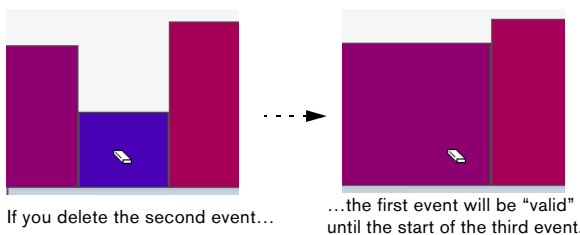
Each velocity bar corresponds to a note in the note display.

Events in the controller display (that is, anything other than velocity values) are shown as “blocks”, the heights of which correspond to the “values” of the events. However, events that have been recorded (or drawn with a low quantize value) may appear more like “filled curves”, simply because they are positioned very closely:



If you zoom in on the upper “curve”, you will find that it consists of separate events.

⇒ Unlike notes, events in the controller display have no length. The value of an event in the display is “valid” until the start of the next event:



For a description of editing in the controller display, see [“Editing in the controller display”](#) on [page 177](#).

Key Editor operations

Zooming

Zooming in the Key Editor is done according to the standard zoom procedures, using the zoom sliders, the Zoom tool or the Zoom submenu on the Edit menu.

- When you drag a rectangle with the Zoom tool, the result depends on the option “Zoom Tool Standard Mode: Horizontal Zooming Only” in the Preferences (Editing–Tools page).

If this is activated, the window will only be zoomed horizontally; if not, the window will be zoomed both horizontally and vertically.

Using the Trim tool

The Trim tool allows you to change the length of note events by cutting off the end or the beginning of notes. It is available in the Key Editor and in the List Editor.

Using the Trim tool means moving the note-on or the note-off event for one or several notes to a position defined with the mouse. Proceed as follows:

1. Select the Trim tool in the Key Editor or the List Editor toolbar.

The mouse pointer changes to a knife symbol.



2. Locate the note(s) that you wish to edit.

- To edit a single note, click on it with the Trim tool. The range between the mouse cursor and the end of the note will be removed.

You can use the mouse position display in the toolbar to find the exact position for the trim operation.

- To edit several notes, click and drag with the mouse across the notes.

A line is displayed. The notes will be trimmed along this line.



Trimming the end of three note events.

- By default, the Trim tool will cut off the end of notes. To trim the beginning of the note(s), press [Alt]/[Option] while dragging.
- If you press [Ctrl]/[Command] while dragging, you will get a vertical trim line, allowing you to set the same start or end time for all edited notes.

You can change the Trim tool key commands in the Preferences (Editing–Tool Modifiers page).

- ⇒ Note that when you trim the beginning of a note in the List Editor, the note may move to a different position in the list (since other events may now begin before the edited event).
- ⇒ Note that the trimmed note ends don't snap to the grid.

Playing back

You can play back your music as usual when working in a MIDI editor. There are several features designed to make editing easier during playback:

Solo button



If you activate the Solo button, only the edited MIDI parts will be heard during regular playback.

Autoscroll



As described in the section “Autoscroll” on [page 38](#), the Autoscroll function makes the window “follow” the project cursor during playback, so that the current play position is visible at all times. However, when you are working in a MIDI editor, you may want to deactivate Autoscroll – this way, the events you are working with will stay visible.

The Autoscroll buttons in each of the MIDI editors are independent of the Project window Autoscroll setting, which means that Autoscroll can be activated in the Project window and deactivated in the MIDI editor you are working in.

Auditioning



If the speaker icon on the toolbar is activated, individual notes will automatically be played back (auditioned) when you move or transpose them, or when you create new notes by drawing. This makes it easier to hear what you're doing.

Snap



Snap activated on the toolbar.

The Snap function helps you find exact positions when editing in a MIDI editor. It does this by restricting horizontal movement and positioning to certain positions. Operations affected by snap include moving, duplicating, drawing, sizing, etc.

- How Snap works depends on the Snap mode pop-up menu next to the Snap button. See “[Snap](#)” on [page 37](#).
- When the “Bars+Beats” display format is selected in the ruler, the snap grid is set by the quantize value on the toolbar. This makes it possible to snap not only to straight note values but also to swing grids set up in the Quantize Setup dialog (see “[The Quantizing functions](#)” on [page 155](#)).

When any of the other display formats is selected in the ruler, positioning is restricted to the displayed grid, i.e. you can snap in finer increments by zooming in, and in coarser increments by zooming out the display.

Coloring notes and events

By using the Colors pop-up menu on the toolbar, you can select a color scheme for the events in the editor. The following options are available:

Option	Description
Velocity	The notes get different colors depending on their velocity values.
Pitch	The notes get different colors depending on their pitch.
Channel	The notes get different colors depending on their MIDI channel value.

Option	Description
Part	The notes get the same color as their respective part in the Project window. Use this option when you are working with two or more tracks in an editor, to make it easier to see which notes belong to which track.
GridMatch	The notes get different colors depending on their time position. This mode makes it easy to see e.g. if the notes in a chord start at the exact same beat.

When any of the options (apart from “Part”) is selected, you can select “Setup” from the Colors pop-up menu. This opens a dialog in which you can specify which colors should be associated with which velocities, pitches or channels, respectively.

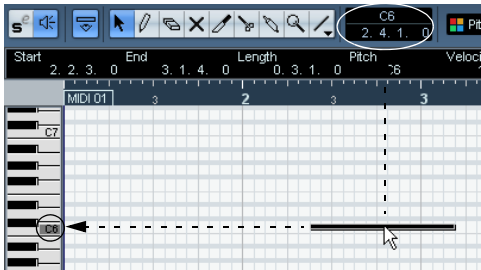
Creating and editing notes

To draw new notes in the Key Editor, you use the Pencil tool or the Line tool.

Drawing notes with the Pencil tool

With the Pencil tool, you insert single notes by clicking at the desired time (horizontal) and pitch position (vertical).

- When you move the pointer in the note display, its bar position is indicated in the toolbar, and its pitch is indicated both in the toolbar and on the piano keyboard to the left. This makes it easy to find the right note and insert position.



- If Snap is activated, this determines the start position of the created note.
- If you click once, the created note will have the length set on the Length Quantize pop-up menu on the toolbar. You can create a longer note by clicking and dragging. The length of the created note will be a multiple of the Length Quantize value.

Drawing notes with the Line tool

The Line tool can be used for creating series of contiguous notes. To do so, click and drag to draw a line and then release the mouse button.

⇒ The Line tool has several different modes.

To select one of the modes, click on the Line tool icon on the toolbar when the tool is already selected. This opens a pop-up menu from which you can select one of the Line tool modes.



The tool icon will change appearance according to the selected mode.

Mode	Description
Line	This is the default mode for the Line tool. When this mode is selected, you click and drag to create a straight line, in any angle. When you release the mouse button, a series of notes will be created, aligned with the line. If Snap is activated, the notes will be spaced and sized according to the Quantize value.
Parabola, Sine, Triangle, Square	These modes insert events along different curve shapes. While they can be used for creating notes, they're probably best suited for controller editing (see “Adding and editing events in the controller display” on page 179).
Paint	Allows you to insert multiple notes by dragging with the mouse button pressed. If Snap is activated, the notes will be positioned and sized according to the Quantize and Length Quantize values. If you press [Ctrl]/[Command] while painting, movement will be restricted to horizontal only (i.e. the painted notes will have the same pitch).

Setting velocity values

When you draw notes in the Key Editor, the notes will get the velocity value set in the insert velocity field on the toolbar.

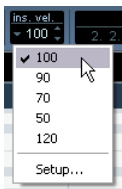
You can use one of four different methods for determining the velocity:

- When a key command is assigned for the Select tool–Edit Velocity action (in the Editing–Tool Modifiers page of the Preferences dialog), you can select one or more notes, press [Ctrl]/[Command]+[Shift] and click on one of the selected notes to change the velocity.

The cursor changes into a speaker and, next to the note, a field with the velocity value appears – the Note Velocity Slider. Move the mouse pointer up or down to change the value. Value changes will be applied to all selected notes, as you can see in the controller lane.

- Selecting a predefined velocity value from the insert velocity pop-up menu.

The menu contains five different predefined velocity values. The “Setup...” item opens a dialog that allows you to specify which five velocity values should be available on the pop-up menu. (This dialog can also be opened by selecting “Insert Velocities...” from the MIDI menu.)



- Manually entering the desired velocity value by clicking in the insert velocity field and typing in the desired value.
- Using a key command.

You can assign a key command to each of the five available velocity values in the Key Commands dialog (MIDI category – the items Insert Velocity 1-5). This allows for quick switching between different velocity values when entering notes. See “Setting up key commands” on page 251 for instructions on how to set up key commands.

Selecting notes

Selecting notes is done using any of the following methods:

- Use the Arrow tool.

The standard selection techniques apply, like selecting by clicking on the note or using a selection rectangle. Note that when you press [Shift] and click on notes or draw a selection rectangle, these notes will be added to the overall selection. When you press [Ctrl]/[Command] and click on notes or draw a selection rectangle, these notes will be removed from the overall selection (standard Windows behavior).

- Use the Select submenu on the Edit menu or Quick menu.

The Select menu options are:

Option	Description
All	Selects all notes in the edited part.
None	Deselects all events.
In Loop	Selects all notes that are partially or completely inside the boundaries of the left and right locators (only visible if locators are set).
From Start to Cursor	Selects all notes that begin to the left of the project cursor.
From Cursor to End	Selects all notes that end to the right of the project cursor.

- You can also use the left and right arrow keys on the computer keyboard to step from one note to another. If you press [Shift] and use the arrow keys, the current selection will be kept, allowing you to select several notes.
- To select all notes of a certain pitch, press [Ctrl]/[Command] and click on the desired key in the keyboard display to the left.



All notes of the corresponding pitch are selected.

You can also press [Shift] and double-click on a note to select all the following notes of the same pitch.

- If the option “Auto Select Events under Cursor” is activated in the Preferences (Editing page), all notes currently “touched” by the project cursor are automatically selected.

Toggle selections

If you want to toggle the selected elements within a selection rectangle, press [Ctrl]/[Command] and enclose the same elements within a new selection rectangle. Once you release the mouse button, the previous selection is deselected and vice versa.



Selecting controllers within the note range

You can select the controllers within the range of the selected notes. The following applies:

- When the Auto Select Controllers button is activated in the toolbar, the controllers will always be selected when the respective notes are selected.
- A note range lasts until the start of the next note or the end of the part.
- Selected controllers for notes are moved when the corresponding notes are moved.

Moving and transposing notes

To move notes in the editor, use any of the following methods:

- Click and drag to a new position.

All selected notes will be moved, maintaining their relative positions. If Snap is activated, this determines to which positions you can move the notes, see ["Snap"](#) on [page 171](#).

⚠ Note also that you can restrict movement to horizontal or vertical only by holding down [Ctrl]/[Command] while dragging.

- Use the up and down arrow keys on the computer keyboard.

This method allows you to transpose the selected notes, without risking to move them horizontally. You can also use the Transpose function (see ["Transpose"](#) on [page 159](#)) or the info line (see ["The info line"](#) on [page 168](#)) for this. Note that pressing [Shift] and using the up and down arrow keys will transpose notes in steps of one octave.

- Use the Move to Cursor function on the Edit menu.

This moves the selected notes to the project cursor position.

- Select a note and adjust its position or pitch on the info line.

See ["Editing on the info line"](#) on [page 176](#).

- Use the Move buttons in the Nudge palette on the toolbar.

This moves the selected note(s) by the amount set on the Quantize pop-up menu.

By default, the Nudge palette isn't shown on the toolbar – see ["The Setup dialogs"](#) on [page 245](#) for more information.

⇒ Note that when you move selected notes to a different position, any selected controllers for these notes will move accordingly.

See also ["Moving and copying events"](#) on [page 180](#).

You can also adjust the position of notes by quantizing (see ["The Quantizing functions"](#) on [page 155](#)).

Duplicating and repeating notes

Notes are duplicated much in the same way as events in the Project window:

- Hold down [Alt]/[Option] and drag the note(s) to a new position.

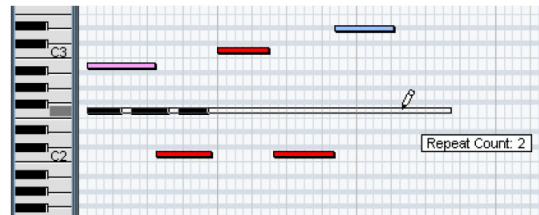
If Snap is activated, this determines to which positions you can copy notes (see ["Snap"](#) on [page 171](#)).

- Selecting Duplicate from the Edit menu creates a copy of the selected note and places it directly after the original. If several notes are selected, all of these are copied "as one unit", maintaining the relative distance between the notes.

- Selecting Repeat from the Edit menu opens a dialog, allowing you to create a number of copies of the selected note(s).

This works like the Duplicate function, but you can specify the number of copies.

- You can also perform the Repeat function by dragging: Select the note(s) to repeat, press [Alt]/[Option], click the right edge of the last selected note and drag to the right. The longer to the right you drag, the more copies are created (as indicated by the tool tip).



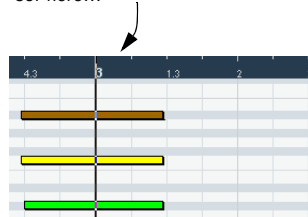
Using cut and paste

You can use the Cut, Copy and Paste options on the Edit menu to move or copy material within a part or between different parts. When you paste copied notes, you can either use the regular Paste function or the function "Paste Time" from the Range submenu of the Edit menu.

- "Paste" inserts the copied notes at the project cursor position without affecting existing notes.

- “Paste Time” inserts at the project cursor position, but moves (and if necessary, splits) existing notes to make room for the pasted notes.

Selecting “Paste Time” with this data on the clipboard and the project cursor here...



...will give you this.

Resizing notes

To resize a note, use one of the following methods:

- Position the arrow tool at the start or end of the note, so that the pointer takes on the shape of a small double arrow. Click and drag to the left or right to resize the note. This method allows you to resize the note from either direction.
- Click with the Pencil tool within the note box and drag to the left or the right (to make the note shorter or longer, respectively).

With both these methods, the resulting length will be a multiple of the Length Quantize value on the toolbar.

- Use the Trim Start/End buttons on the Nudge palette on the toolbar.

This resizes the selected note(s) by moving their start or end positions, in steps according to the Length Quantize value on the toolbar. By default, the Nudge palette isn't shown on the toolbar – see [“The Setup dialogs”](#) on [page 245](#) for more information.

- Select the note and adjust its length on the info line. See [“Editing on the info line”](#) on [page 176](#) for details on info line editing.
- Use the Trim tool, see [“Using the Trim tool”](#) on [page 170](#).

Splitting notes

There are three ways to split notes:

- Clicking on a note with the Scissors tool splits the note at the position you pointed (taking the Snap setting into account if activated).

If several notes are selected, they are all split at the same position.

- If you select “Split at Cursor” in the Edit menu, all notes that are intersected by the project cursor are split at the cursor position.

- If you select “Split Loop” in the Edit menu, all notes that are intersected by the left or right locator are split at the locator positions.

Gluing notes

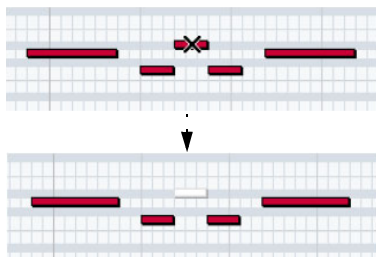
Clicking on a note with the Glue Tube tool will “glue it together” with the next note of the same pitch. The result will be one long note spanning from the start of the first note to the end of the second note and with the properties (velocity, etc.) of the first note.

Muting notes

Individual notes can be muted in the Key Editor, as opposed to muting an entire MIDI part in the Project window. This allows you to exclude notes from playback, but keep the option to bring them back again at any time. To mute a note, use one of the following methods:

- Click on it with the Mute tool.
- Drag a rectangle with the Mute tool, enclosing all notes you want to mute.
- Select the note(s) and choose Mute from the Edit menu.

The default key command for this is [Shift]+[M].



Muted notes are “dimmed” in the note display.

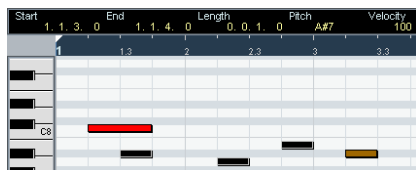
To unmute a note, either click it or enclose it with the Mute tool, or select it and choose Unmute from the Edit menu. The default key command for this is [Shift]+[U].

Deleting notes

To delete notes, either click on them with the Eraser tool or select them and press [Backspace].

Editing on the info line

The info line shows the values and properties of the selected event(s). If a single event is selected, its values are displayed on the info line. If several events are selected, the info line shows the values of the first of these events in yellow.



Several events selected.

You can edit the values on the info line using regular value editing. This allows you to move, resize, transpose or change velocity of events in a very precise manner. It's also possible to click the Pitch or Velocity field in the info line and play a note on your MIDI keyboard – the pitch or velocity will be adjusted according to the note you played.

⇒ If you have several events selected and change a value, all selected events will be changed by the set amount.

⇒ If you have several events selected, hold down [Ctrl]/[Command] and change a value, the change will be absolute.

In other words, the value setting will be the same for all selected events.

Editing notes via MIDI

You can change the properties of notes via MIDI. For example, this can be a fast way to get the right velocity value, since you will hear the result even as you edit:

1. Select the note you want to edit.
2. Click on the MIDI connector symbol on the toolbar.



Click this button to enable editing via MIDI.

3. Use the note buttons on the toolbar to decide which properties should be changed by the MIDI input. You can enable editing of pitch, note-on and/or note-off velocity.



With this setting, the edited notes will get the pitch and velocity values of the notes input via MIDI, but the note-off velocities will be kept as they are.

4. Play a note on your MIDI instrument.

The note selected in the editor will get the pitch, velocity and/or note-off velocity of the played note.

The next note in the edited part is automatically selected, making it easy to quickly edit a series of notes.

- If you want another try, select the note again (e.g. by pressing the left arrow key on the computer keyboard) and again play a note on your MIDI instrument.

Step input

Step input, or step recording, is when you enter notes one at a time (or one chord at a time) without worrying about the exact timing. This is useful e.g. when you know the part you want to record but are not able to play it exactly as you want it.

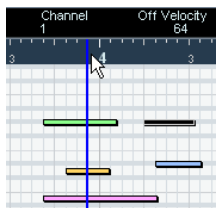
Proceed as follows:

1. Click the Step Input button on the toolbar to activate Step Input mode.



2. Use the note buttons to the right to decide which properties should be included when you input the notes. For example, you may not want to include the velocity and/or note-off velocity of the played notes. It's also possible to turn off the pitch property, in which case all notes will get the pitch C3, no matter what you play.

3. Click anywhere in the note display to set the start position (the desired position of the first note or chord). The step input position is shown as a blue line in the note display, and in the lower mouse pointer display in the toolbar.



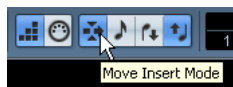
4. Specify the desired note spacing and length with the Quantize and Length Quantize pop-up menus.

The notes you input will be positioned according to the Quantize value and have the length set with the Length Quantize value. For instance, if you set Quantize to 1/8 notes and Length Quantize to 1/16 note, the notes will be sixteenth notes, appearing on each eighth note position.

5. Play the first note or chord on your MIDI instrument.

The note or chord appears in the editor and the step input position advances one quantize value step.

⇒ If Insert mode is activated, all notes to the right of the step input position will be moved to “make room” for the inserted note or chord.



Insert mode activated.

6. Continue in the same way with the rest of the notes or chords.

You can adjust the Quantize or Length Quantize value as you go along, to change the timing or note lengths. You can also move the step input position manually by clicking anywhere in the note display.

- To insert a “rest”, press the right arrow key on the computer keyboard.

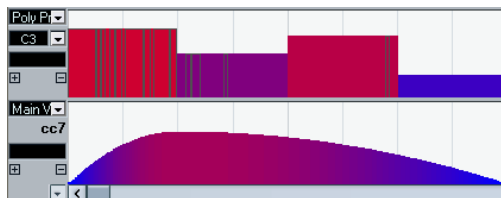
This advances the step input position one step.

7. When you’re done, click the Step Input button again to deactivate step input.

Editing in the controller display

About controller lanes

By default, the controller display has a single lane, showing one event type at a time. However, you can add lanes by right-clicking in the display and selecting “Create new controller lane” from the Quick menu. This allows you to view and edit different controllers at the same time.



The controller display with two lanes set up.

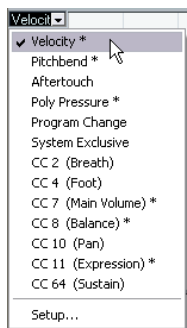
- To remove a lane, right-click in it and select “Remove this Lane” from the Quick menu, or click on the minus button. This hides the lane from view – it doesn’t affect the events in any way.

- If you remove all lanes, the controller display will be completely hidden.

To bring it back again, select “Create new controller lane” from the Quick menu.

Selecting the event type

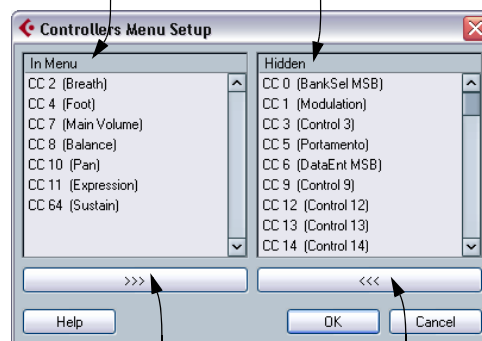
Each controller lane shows one event type at a time. To select which type should be displayed, use the pop-up menu to the left of the lane.



- Selecting “Setup...” opens a dialog in which you can specify which continuous controller event types should be available on the pop-up menu.

Controller types in this list are already listed on the pop-up menu.

Controller types in this list are not listed on the pop-up menu.



Click this button to remove the controller type selected in the left list from the pop-up menu.

Click this button to add the selected controller type to the pop-up menu.

- Each MIDI track has its own controller lane setup (number of lanes and selected event types).

When you create new tracks, they get the controller lane setup used last.

Controller lane presets

Once you have added the required number of controller lanes and selected the event types you need, you can store this combination as a controller lane preset. You could for example have a preset with one velocity lane only, another with a combination of velocity, pitch bend and modulation, and so on. This can make working with controllers much quicker.

- To add the current controller lane setup as a preset, pull down the pop-up menu to the left of the horizontal scrollbar and select “Add”.

Enter a name for the preset in the dialog that appears and click OK.

- To apply a stored preset, select it from the pop-up menu.

This immediately brings up the controller lanes and event types in the preset.

- To remove or rename presets, select “Organize” from the pop-up.

Editing velocity values

When “Velocity” is selected for viewing, the lane shows the velocity of each note as a vertical bar.



Velocity values are edited with the Pencil or the Line tool. The different tools and Line tool modes offer several possibilities, as listed below.

- ⇒ If the option “Controller Lane Editing: Select Tool defaults to Pen” is activated in the Preferences (Editing–MIDI page), the Arrow tool automatically switches to the Pencil tool when you move the pointer into the controller display. If you want to use the Arrow tool to select events in the controller display, press [Ctrl]/[Command].

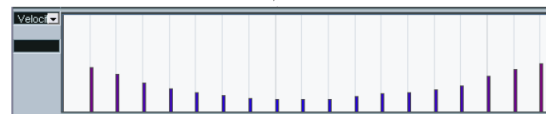
- ⇒ If the Speaker icon (Acoustic Feedback) is activated on the toolbar, the notes will be played back when you adjust the velocity, allowing you to audition your changes.

- You can use the Pencil tool to change the velocity of a single note: click on its velocity bar and drag the bar up or down.

While you drag, the current velocity value is shown in the display to the left.

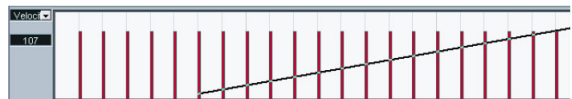
- You can use the Pencil tool or the Line tool in Paint mode to change the velocity values of several notes by painting a “freehand curve”.

When editing velocity, these two methods have the same functionality.

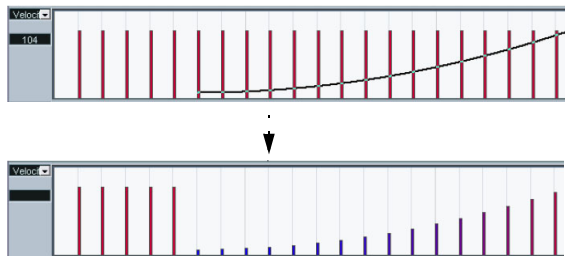


- Use the Line tool in Line mode for creating linear velocity ramps.

Click where you want the ramp to start and drag the cursor to where you want the ramp to end. When you release the mouse button, the velocity values are aligned with the line between the two points.



- Parabola mode works in the same way, but aligns the velocity values to a Parabola curve instead. Use this for smooth, “natural” velocity fades, etc.



- The remaining three Line tool modes (Sine, Triangle and Square) align the velocity values to continuous curve shapes (see below).

Note:

- If there is more than one note at the same position (e.g. a chord), their velocity bars will overlap in the controller lane. If none of the notes are selected, all notes at the same position will be set to the same velocity value when you draw. To edit the velocity of only one of the notes at the same position, first select the note in the note display. Now, editing will only affect the velocity of the selected note.

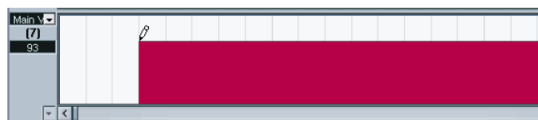
You can also adjust the velocity of a single note by selecting it and changing its velocity value on the info line.

Adding and editing events in the controller display

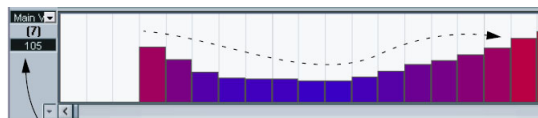
When any option other than “Velocity” is selected for a controller lane, you can create new events or edit the values of existing events using the Pencil tool or the Line tool in its various modes:

- Clicking with the Pencil tool or the Line tool in Paint mode creates a new event. Note the “Select Tool defaults to Pen” option – see [“Editing velocity values” on page 178](#).
- Press [Alt]/[Option] and use the Pencil tool or the Line tool in Paint mode to modify the value of an event (without creating a new one). Note that you can click and drag to change or add multiple events, draw controller curves, etc. You can press or release [Alt]/[Option] while drawing, switching dynamically between “edit mode” and “create mode”.

If you want to enter or adjust a single event, click once with the Pencil tool or the Line tool in Paint mode.



If you want to “paint a curve”, drag the tool (with the mouse button pressed):



When you move the pointer in the controller lane, the corresponding value is displayed in this field.

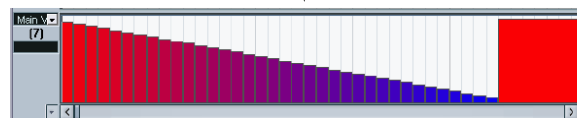
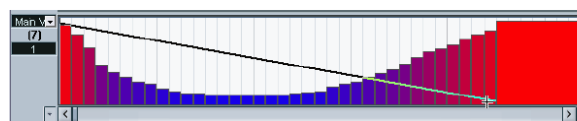
⇒ With the Pencil tool and the Line tool in Paint mode, the quantize value determines the “density” of created controller curves (if Snap is activated, see [“Snap” on page 171](#)). For very smooth curves, you should use a small quantize value or turn off Snap. However, this will create a very large number of MIDI events, which can cause MIDI playback to “stutter” in some situations. A medium-low density is often sufficient.

- Clicking and dragging with the Line tool in Line mode shows a line in the controller lane, and creates events with values aligned to this line.

This is the best way to draw linear controller ramps. If you press [Alt]/[Option], no new events are created – use this mode for modifying existing controller curves.

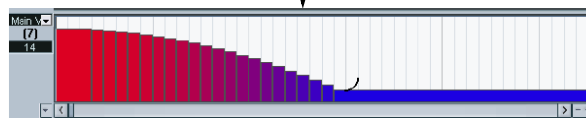
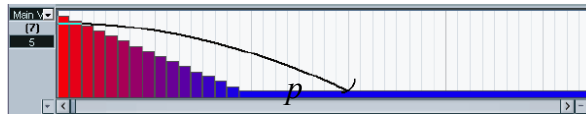


Converting a controller curve to a ramp using the Line tool.



- The Parabola mode works in the same way, but aligns the values to a parabola curve instead, giving more “natural” curves and fades.

Note that the result depends on the direction from which you draw the parabola.



- In Parabola mode, you can use modifier keys to determine the shape of the parabola curve.

If you press [Ctrl]/[Command], the parabola curve will be reversed. If you press [Alt]/[Option]+[Ctrl]/[Command] while Snap is activated, you can change the position of the whole curve (in both cases the snap value for the positioning will be a quarter of the quantize value). If you press [Shift], the exponent will be increased or decreased.

⇒ In Line and Parabola modes, the length quantize value determines the “density” of created controller curves (if Snap is activated).

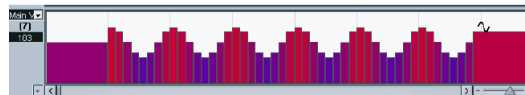
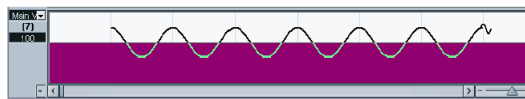
For very smooth curves, you should use a small length quantize value or turn off Snap. To avoid over-dense controller curves (which may cause MIDI playback to “stutter”), use a medium-low density.

- The Sine, Triangle and Square modes create events with values aligned to continuous curves.

In these modes, the quantize value determines the period of the curve (the length of one curve “cycle”) and the length quantize value determines the density of the events (the lower the length quantize note value, the smoother the curve).

- In Sine, Triangle and Square mode you can also use modifier keys to determine the shape of the curve.

If you press [Ctrl]/[Command] you can change the phase of the beginning of the curve, if you press [Alt]/[Option]+[Ctrl]/[Command] while snap is activated you can change the position of the whole curve (in both cases the snap value for the positioning will be a quarter of the quantize value).



⇒ You can also set the curve period freely by holding down [Shift] when you insert events in Sine, Triangle or Square mode.

Activate Snap, [Shift]-click and drag to set the length of one period. The period length will be a multiple of the quantize value.

- In Triangle and Square mode, you can press [Shift]+[Ctrl]/[Command] to change the maximum position of the triangle curve (to create sawtooth curves) or the pulse of the square curve. As in other modes, you can press [Alt]/[Option] if you want to change the existing events rather than creating new ones. Again, the snap value for the positioning will be a quarter of the quantize value.

Moving and copying events

You can move or duplicate events in a controller lane, much like you can with notes:

1. Click with the Arrow tool to select the events you want to cut or copy.

If the option “Controller Lane Editing: Select Tool defaults to Pen” is activated in the Preferences (Editing–MIDI page), you need to press [Ctrl]/[Command] to get the Arrow tool.

2. Click and drag the events to move them.

If Snap is activated, this determines to which positions you can move the events (see “Snap” on [page 171](#)).

- If you hold down [Alt]/[Option] and drag, the events will be copied rather than moved.



If there is an event of the same type at the exact same position already, this will be replaced by the moved event.

- ⚠ Remember that a non-note event doesn't have a length – it's "valid" until the next event (see ["The controller display"](#) on [page 169](#)).
- ⚠ When the Auto Select Controllers button is activated in the Key Editor toolbar, selecting controller events will also select the corresponding notes. Moving events (either using cut/copy/paste or drag & drop) in the note display will also move the corresponding controller events and vice versa. See also ["Selecting controllers within the note range"](#) on [page 174](#).

Using cut, copy and paste

You can use the standard Cut, Copy and Paste options on the Edit menu to move or copy events in the controller display:

1. Select the events you want to cut or copy.
2. Select Cut or Copy from the Edit menu.
3. If you want to paste the events into another MIDI part, open that part in another Key Editor window.
4. Position the project cursor where you want to paste the events.
5. Select Paste from the Edit menu.

The events on the clipboard are added, starting at the project cursor position, maintaining their relative distances. If a pasted event ends up at the same position as an existing event of the same type, the old event is replaced.

Deleting events in the controller display

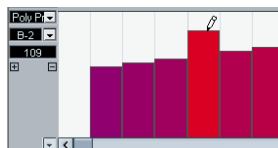
You delete events by clicking on them with the Eraser tool or by selecting them and pressing [Backspace]. Please note:

- Deleting a controller event makes the last event before this valid up until the next event. It does not "zero" any controller changes.
- You can delete notes by deleting their velocity bars in the controller display.

Please be aware that if there is more than one note on the same position, there may still only be one velocity bar visible – make sure you delete only the desired notes!

Adding and editing Poly Pressure events

Poly Pressure events are special, in that they "belong to" a specific note number (key). That is, each Poly Pressure event has two editable values: the note number and the amount of pressure. Therefore, when Poly Pressure is selected on the event type pop-up menu, there are two value fields to the left of the controller display, one for the note number and one for the amount:



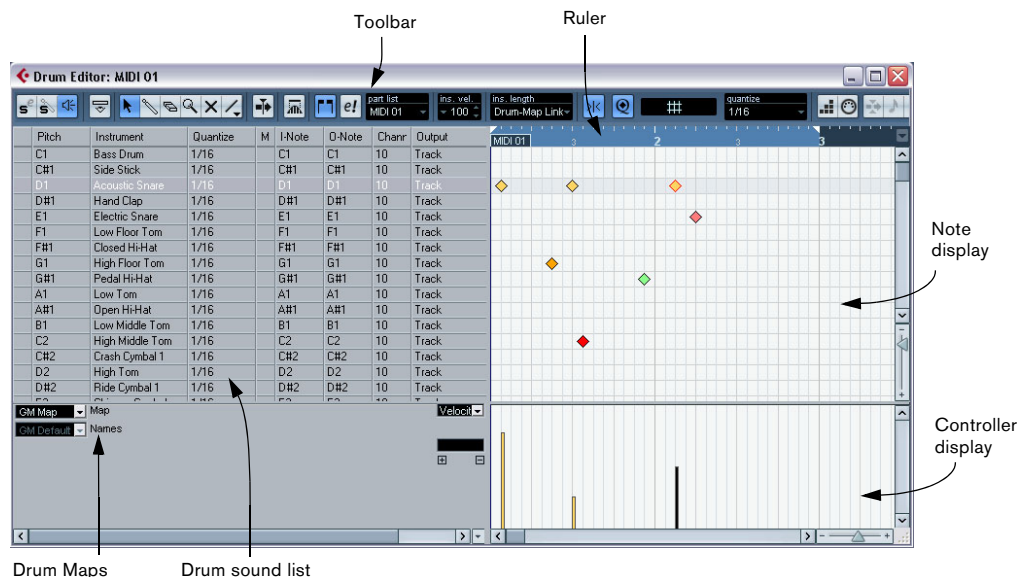
To add a new Poly Pressure event, proceed as follows:

1. Select Poly Pressure on the event type pop-up menu.
2. Set the note number by clicking on the keyboard display.
The selected note number is displayed in the upper value field to the left of the controller display. Note that this only works for the topmost lane. If you have selected "Poly Pressure" for several controller lanes, you have to type in the desired note number directly in the lower value field to the left of each lane.
3. Use the Pencil tool to add a new event, just as when adding regular controller events.

To view and edit existing Poly Pressure events, proceed as follows:

1. Select Poly Pressure on the event type pop-up menu.
 2. Click on the arrow button next to the note number field to the left of the controller lane.
A pop-up menu appears, listing all note numbers for which there already are Poly Pressure events.
 3. Select a note number from the pop-up menu.
The Poly Pressure events for the selected note number are shown in the controller lane.
 4. Use the Pencil tool to edit the events as usual.
Press [Alt]/[Option] to edit existing events without adding any new ones.
- Poly Pressure events can also be added and edited in the List Editor.

The Drum Editor – Overview



The toolbar and info line

These are much the same as the toolbar and info line in the Key Editor (see [“The Key Editor – Overview”](#) on [page 168](#)), with the following differences:

- The Drum Editor has no Pencil tool – instead there is a Drumstick tool (for entering and removing notes) and a Line tool with various line and curve modes (for drawing several notes in one go or editing controller events).
 - There are no Scissors and Glue Tube tools in the Drum Editor.
 - As in the Key Editor, the mouse pointer display in the toolbar shows the pitch and position of the pointer, but the pitch is shown as a drum sound name rather than a note number.
 - The Use Global Quantize button allows you to select which value should be used when Snap is activated – the global quantize value on the toolbar or the individual quantize values for the drum sounds.
 - Instead of a Length Quantize pop-up, there is an Insert Length pop-up menu.
- It is used in much the same way, as described on the following pages.

The drum sound list

Pitch	Instrument	Quantize	M	I-Note	O-Note	Chanr	Output
C1	Bass Drum	1/16		C1	C1	10	Track
C#1	Side Stick	1/16		C#1	C#1	10	Track
D1	Acoustic Snare	1/16		D1	D1	10	Track
D#1	Hand Clap	1/16		D#1	D#1	10	Track
E1	Electric Snare	1/16		E1	E1	10	Track
F1	Low Floor Tom	1/16		F1	F1	10	Track
F#1	Closed Hi-Hat	1/16		F#1	F#1	10	Track
G1	High Floor Tom	1/16		G1	G1	10	Track
G#1	Pedal Hi-Hat	1/16		G#1	G#1	10	Track
A1	Low Tom	1/16		A1	A1	10	Track
A#1	Open Hi-Hat	1/16		A#1	A#1	10	Track
B1	Low Middle Tom	1/16		B1	B1	10	Track
C2	High Middle Tom	1/16		C2	C2	10	Track

A drum sound list for GM Drum Map.

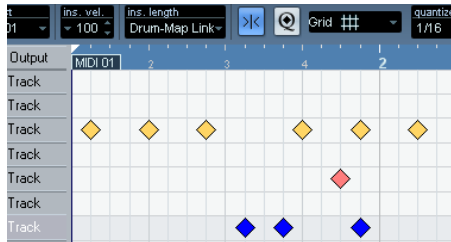
The purpose of the Drum Editor is to edit MIDI tracks where each note (pitch) plays a separate sound, as is typically the case with a MIDI drum kit. The drum sound list to the left lists all drum sounds by name (according to the selected drum map or name list – see below), and lets you adjust and manipulate the drum sound setup in various ways.

Note:

- The number of columns in the list depends on whether a drum map is selected for the track or not.
- See [“Working with drum maps”](#) on [page 185](#).

- You can reorder the columns by dragging the column headings, and resize them by dragging the dividers between the column headings.

The note display



The note display of the Drum Editor displays notes as diamond symbols. The vertical position of the notes corresponds to the drum sound list to the left, while the horizontal position corresponds to the note's position in time, just as in the Key Editor. Note however, that the diamond symbols don't indicate the length of the notes. This makes sense, since drum sounds most often are "one-shot" samples that play to their end regardless of the note lengths.

Drum map and name pop-up menus



Below the drum sound list you will find two pop-up menus, used for selecting a drum map for the edited track or (if no drum map is selected) a list of drum sound names. For an explanation of drum maps, see ["Working with drum maps"](#) on [page 185](#).

Controller display

The controller display in the Drum Editor is exactly the same as in the Key Editor. You can add or remove controller lanes via the Quick menu, and create and edit events as described in the section ["Editing in the controller display"](#) on [page 177](#).

Drum Editor operations

The basic handling (zooming, playback, auditioning, etc.) is the same as in the Key Editor (see ["Key Editor operations"](#) on [page 170](#)). The following sections describe the procedures and features specific to the Drum Editor.

Creating and editing notes

The standard way of entering notes in the Drum Editor is to click with the Drumstick tool.



When you move the pointer in the note display, its bar position and drum sound is indicated in the toolbar, making it easy to find the right sound and position.

The position of the created note depends on the following factors:

- If Snap is deactivated on the toolbar, the note will appear exactly where you clicked. In this mode, notes can be positioned freely.
- If Snap is activated and Use Global Quantize is deactivated on the toolbar, the note will snap to positions according to the quantize value set for the sound in the drum sound list.
- If both Snap and Use Global Quantize are activated, the note will snap to positions according to the Quantize setting on the toolbar (next to the Use Global Quantize button).

The length of the inserted note is determined by the Insert Length setting on the toolbar. However, if this is set to "Drum-Map Link", the note will get the length of the quantize value for the drum sound.

- ⇒ You can quickly audition the drum sounds by clicking in the leftmost column in the drum sound list. This plays the corresponding note.

⇒ Clicking with the Drumstick tool on an existing note will remove it.
This makes drum pattern editing very quick and intuitive.

Setting velocity values

The notes you enter will get the insert velocity value set in the insert velocity field on the toolbar – to speed up things you may want to assign key commands to the insert velocity options. See [“Setting velocity values” on page 172](#).

Selecting notes

Selecting notes is done by any of the following methods:

- Use the Arrow tool.
The standard selection techniques apply.
- Use the Select submenu on the Quick menu (see [“Selecting notes” on page 173](#)).
- Use the left and right arrow keys on the computer keyboard to step from one note to the next or previous note. If you press [Shift] and use the arrow keys, the current selection will be kept, allowing you to select several notes.
- You can also press [Shift] and double-click on a note to select all the following notes for the same drum sound.
- If the option “Auto Select Events under Cursor” is activated in the Preferences (Editing page), all notes currently “touched” by the project cursor are automatically selected.

Moving, duplicating or repeating notes

To move or copy notes in the editor (to other positions or other drum sounds), you use the same methods as in the Key Editor: click and drag, use the arrow keys or Edit menu functions, etc. – see [“Moving and transposing notes” on page 174](#). There is one thing to note:

When you are moving or copying several selected notes by dragging them and Snap is activated but Use Global Quantize is deactivated, the notes will snap to positions according to the quantize values for the drum sounds. If the moved/copied notes have different quantize values, the largest value will determine snapping. For example, if you are moving two notes, with the quantize values 1/16 and 1/4 respectively, the notes will snap to quarter notes (1/4).

⇒ You can also adjust the position of notes by quantizing (see [“The Quantizing functions” on page 155](#)).
Again, which quantize value is used depends on whether Global Quantize is used.

Muting notes and drum sounds

You can mute individual notes by clicking or enclosing them with the Mute tool or by using the Mute function on the Edit menu (see [“Muting notes” on page 175](#)).

Furthermore, if a drum map is selected (see [“Selecting a drum map for a track” on page 187](#)), the drum sound list will have a Mute column. Click in the Mute column for a drum sound to mute that sound. Finally, clicking the Drum Solo button will mute all drum sounds other than the selected one.

Pitch	Instrument	Quantize	M	I-Note	O-Note	Chanr	Output
C#1	Side Stick	1/16		C#1	C#1	10	Track
D1	Acoustic Snare	1/16		D1	D1	10	Track
D#1	Hand Clap	1/16		D#1	D#1	10	Track
E1	Electric Snare	1/16		E1	E1	10	Track
F1	Low Floor Tom	1/16		F1	F1	10	Track
F#1	Closed Hi-Hat	1/16	●	F#1	F#1	10	Track
G1	High Floor Tom	1/16		G1	G1	10	Track

Muted drum sounds

⚠ Please note that the mute state for drum sounds is part of the drum map, so any other tracks using the same map will also be affected.

Deleting notes

To delete notes, click on them with the Drumstick or Eraser tool or select them and press [Backspace].

Other editing methods

As in the Key Editor, you can edit notes on the info line or via MIDI, and enter notes using step input, see [“Editing on the info line” on page 176](#).

Working with drum maps

Background

A drum kit in a MIDI instrument is most often a set of different drum sounds with each sound placed on a separate key (i.e. the different sounds are assigned to different MIDI note numbers). One key plays a bass drum sound, another a snare and so on.

Unfortunately, different MIDI instruments often use different key assignments. This can be troublesome if you have made a drum pattern using one MIDI device, and then want to try it on another. When you switch device, it is very likely that your snare drum becomes a ride cymbal, or your hi-hat becomes a tom, etc. – just because the drum sounds are distributed differently in the two instruments.

To solve this problem, and simplify several aspects of MIDI drum kits (like using drum sounds from different instruments in the same “drum kit”), Cubase AI features so-called drum maps. A drum map is a list of drum sounds, with a number of settings for each sound. When you play back a MIDI track for which you have selected a drum map, the MIDI notes are “filtered” through the drum map before being sent to the MIDI instrument. Among other things, the map determines which MIDI note number is sent out for each drum sound, and so which sound is played in the receiving MIDI device.

A solution to the problem above would therefore be to set up drum maps for all your instruments. When you want to try your drum pattern on another instrument, you simply switch to the corresponding drum map and your snare drum sound will remain a snare drum sound.

Drum map settings

A drum map consists of settings for 128 drum sounds (one for each MIDI note number). To get an overview of these settings, open the Drum Editor and use the Map pop-up menu below the drum sound list to select the “GM Map” drum map.



This drum map is set up according to the General MIDI standard. For information on how to load, create and select other drum maps, see “Managing drum maps” on [page 187](#).

Now, take a look at the drum sound list (you may have to drag the divider between the list and the note display to the right to see all columns). The columns show the settings of the drum map for each sound.

Pitch	Instrument	Quantize	M	I-Note	O-Note	Chanr	Output
C1	Bass Drum	1/16		C1	C1	10	Track
C#1	Side Stick	1/16		C#1	C#1	10	Track
D1	Acoustic Snare	1/16		D1	D1	10	Track
D#1	Hand Clap	1/16		D#1	D#1	10	Track
E1	Electric Snare	1/16		E1	E1	10	Track
F1	Low Floor Tom	1/16		F1	F1	10	Track
F#1	Closed Hi-Hat	1/16		F#1	F#1	10	Track
G1	High Floor Tom	1/16		G1	G1	10	Track
G#1	Pedal Hi-Hat	1/16		G#1	G#1	10	Track
A1	Low Tom	1/16		A1	A1	10	Track
A#1	Open Hi-Hat	1/16		A#1	A#1	10	Track
B1	Low Middle Tom	1/16		B1	B1	10	Track
C2	High Middle Tom	1/16		C2	C2	10	Track

Here’s a brief description (details follow below):

Column	Description
Pitch	The actual note number of the drum sound. This is what links notes on a MIDI track to drum sounds. For example, with the above drum map, all MIDI notes with the pitch C1 would be mapped to the Bass Drum sound.
Instrument	The name of the drum sound.
Quantize	This value is used when entering and editing notes as described in the sections “Creating and editing notes” on page 183 and “Moving, duplicating or repeating notes” on page 184 .
Mute	Allows you to mute a drum sound, excluding it from playback. See “Muting notes and drum sounds” on page 184 .

Column	Description
I-note	This is the "input note" for the drum sound. When this MIDI note is sent into Cubase AI, (i.e. played by you), the note will be mapped to the corresponding drum sound (and automatically transposed according to the Pitch setting for the sound).
O-note	This is the "output note", i.e. the MIDI note number that is sent out every time the drum sound is played back.
Channel	The drum sound will be played back on this MIDI channel.
Output	The drum sound will be played back on this MIDI output. If you set this to "Default", the MIDI output selected for the track will be used.

⇒ All settings in a drum map (except the Pitch) can be changed directly in the drum sound list or in the Drum Map Setup dialog (see ["The Drum Map Setup dialog"](#) on [page 187](#)).

Note that the changes you make will affect all tracks that use the drum map.

About Pitch, I-note and O-note

This can be a somewhat confusing area, but once you've grasped how it all works it's not very complicated. Going through the following "theory" will help you make the most out of the drum map concept – especially if you want to create your own drum maps.

As mentioned earlier, a drum map is a kind of "filter", transforming notes according to the settings in the map. It does this transformation twice; once when it receives an incoming note (i.e. when you play a note on your MIDI controller) and once when a note is sent from the program to the MIDI sound device.

In the following example, we have modified the drum map, so that the Bass Drum sound has different Pitch, I-note and O-note values.

	Pitch	Instrument	Quantize	M	I-Note	O-Note	Channel
	C1	Bass Drum	1 - 16 Note		A1	B0	10
	C#1	Side Stick	1 - 16 Note		C#1	C#1	10
	D1	Acoustic Snare	1 - 16 Note		D1	D1	10
	D#1	Hand Clap	1 - 16 Note		D#1	D#1	10

I-notes (input notes)

Let's look at what happens on input: When you play a note on your MIDI instrument, the program will look for this note number among the I-notes in the drum map. In our case, if you play the note A1, the program will find that this is the I-note of the Bass Drum sound.

This is where the first transformation happens: the note will get a new note number according to the Pitch setting for the drum sound. In our case, the note will be transformed to a C1 note, because that is the pitch of the Bass Drum sound. If you record the note, it will be recorded as a C1 note.

O-notes (output notes)

The next step is the output. This is what happens when you play back the recorded note, or when the note you play is sent back out to a MIDI instrument in real time (MIDI Thru):

The program checks the drum map and finds the drum sound with the pitch of the note. In our case, this is a C1 note and the drum sound is the Bass Drum. Before the note is sent to the MIDI output, the second transformation takes place: the note number is changed to that of the O-note for the sound. In our example, the note sent to the MIDI instrument will be a B0 note.

Usage

So, what's the point of all this? Again, the purposes are different for I-notes and O-notes:

⇒ Changing the I-note settings allows you to choose which keys will play which drum sounds, when playing or recording from a MIDI instrument.

For example, you may want to place some drum sounds near each other on the keyboard so that they can be easily played together, move sounds so that the most important sounds can be played from a short keyboard, play a sound from a black key instead of a white, and so on. If you never play your drum parts from a MIDI controller (but draw them in the editor) you don't need to care about the I-note setting.

⇒ The O-note settings let you set things up so that the "Bass Drum" sound really plays a bass drum.

If you're using a MIDI instrument in which the bass drum sound is on the C2 key, you set the O-note for the Bass Drum sound to C2. When you switch to another instrument (in which the bass drum is on C1) you want the Bass Drum O-note set to C1. Once you have set up drum maps for all your MIDI instruments, you don't have to care about this anymore – you just select another drum map when you want to use another MIDI instrument for drum sounds.

The channel and output settings

You can set separate MIDI channels and/or MIDI outputs for each sound in a drum map. The following rules apply:

- When a drum map is selected for a track, the MIDI channel settings in the drum map override the MIDI channel setting for the track.

In other words, the MIDI channel setting you make in the Track list or Inspector for the track is normally disregarded. If you want a drum sound to use the channel of the track, set it to channel “Any” in the drum map.

- If the MIDI output is set to “default” for a sound in a drum map, the sound will use the MIDI output selected for the track.

Selecting any other option allows you to direct the sound to a specific MIDI output.

By making specific MIDI channel and output settings for all sounds in a drum map, you can direct your drum tracks directly to another MIDI instrument simply by selecting another drum map – you don’t need to make any channel or output changes for the actual track.

⇒ To select the same MIDI channel for all sounds in a drum map, click the Channel column, press [Ctrl]/[Command] and select the desired channel.

All drum sounds will be set to this MIDI channel. The same procedure can be used for selecting the same MIDI output for all sounds as well.

It can also be useful to select different channels and/or outputs for different sounds. This allows you to construct drum kits with sounds from several different MIDI devices, etc.

Managing drum maps

Selecting a drum map for a track

To select a drum map for a MIDI track, use the Map pop-up menu in the Inspector or in the Drum Editor:



Selecting “No Drum Map” turns off the drum map functionality in the Drum Editor. Even if you don’t use a drum map, you can still separate sounds by name using a name list (see [“Using drum name lists”](#) on [page 188](#)).

⚠ Initially, the Map pop-up menu will only contain one map: “GM Map”. However, you will find a number of drum maps included on the program DVD – how to load these is described below.

The Drum Map Setup dialog

To set up and manage your drum maps, select Drum Map Setup from the Map pop-up menus or the MIDI menu. This opens the following dialog:

Pitch	Instrument	Quantize	M	I>Note	O>Note	Chan#	Output
C1	Bass Drum	1/16		C1	C1	10	Track
CB1	Side Stick	1/16		CB1	CB1	10	Track
D1	Acoustic Snare	1/16		D1	D1	10	Track
DB1	Hand Clap	1/16		DB1	DB1	10	Track
E1	Electric Snare	1/16		E1	E1	10	Track
F1	Low Floor Tom	1/16		F1	F1	10	Track
FB1	Closed Hi-Hat	1/16		FB1	FB1	10	Track
G1	High Floor Tom	1/16		G1	G1	10	Track
GB1	Pedal Hi-Hat	1/16		GB1	GB1	10	Track
A1	Low Tom	1/16		A1	A1	10	Track
AB1	Open Hi-Hat	1/16		AB1	AB1	10	Track
B1	Low Middle Tom	1/16		B1	B1	10	Track
C2	High Middle Tom	1/16		C2	C2	10	Track
CB2	Crash Cymbal 1	1/16		CB2	CB2	10	Track
DB2	High Tom	1/16		DB2	DB2	10	Track
FB2	Ride Cymbal 1	1/16		FB2	FB2	10	Track
E2	Chinese Cymbal	1/16		E2	E2	10	Track
F2	Ride Bell	1/16		F2	F2	10	Track
FB2	Tambourine	1/16		FB2	FB2	10	Track

The Drum Map setup dialog.

This is where you load, create, modify and save drum maps. The list to the left shows the currently loaded drum maps; selecting a drum map in the list displays its sounds and settings to the right.

⇒ The settings for the drum sounds are exactly the same as in the Drum Editor (see [“Drum map settings”](#) on [page 185](#)).

As in the Drum Editor, you can click the leftmost column to audition a drum sound. Note: if you audition a sound in the Drum Map Setup dialog, and the sound is set to MIDI output “Default”, the output selected on the Output pop-up menu in the lower left corner will be used. When auditioning a Default output sound in the Drum Editor, the MIDI output selected for the track will be used, as described in section [“The channel and output settings”](#) on [page 187](#).

Open the Functions pop-up menu in the top left corner to open a list of available functionalities:

Button	Description
New Map	Click this to add a new drum map to the project. The drum sounds will be named "Sound 1, Sound 2" and so on, and have all parameters set to default values. The map will be named "Empty Map", but you can rename it by clicking and typing in the list.
New Copy	Adds a copy of the currently selected drum map. This is probably the quickest way to create a new drum map: select the map that is similar to what you want, create a copy, change the desired drum sound settings and rename the map in the list.
Remove	Removes the selected drum map from the project.
Load	Opens a file dialog, allowing you to load drum maps from disk. On the Cubase AI DVD you will find a number of drum maps for different MIDI instruments – use this function to load the desired maps into your project.
Save	Opens a file dialog for saving the drum map selected in the list. If you have created or modified a drum map, you should use this function to save it as a file on disk – this allows you to load it into other projects. Drum map files have the extension ".drm".
Init Display Notes	Allows you to reset the Display Notes entry to the original setting, i.e. the Pitch entry.
Close	Closes the dialog.

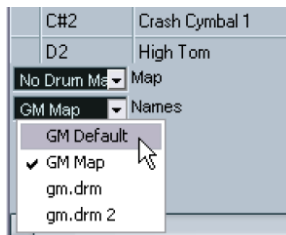
⇒ Drum maps are saved with the project files. If you have created or modified a drum map, you should use the Save function to store it as a separate XML file, available for loading into other projects.

If you always want to have the same drum map(s) included in your projects, you may want to load these into the template – see ["Save as Template"](#) on [page 239](#).

Using drum name lists

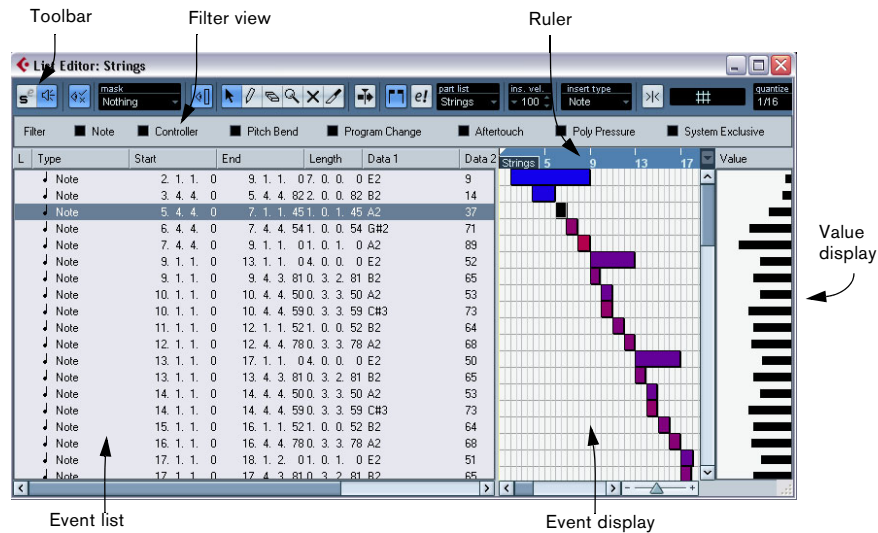
Even if no drum map is selected for the edited MIDI track, you can still use the Drum Editor if needed. As previously mentioned, the drum sound list will then only have four columns: Audition, Pitch, Instrument (drum sound name) and Quantize. There will be no I-note and O-note functionality.

In this mode, the names shown in the Instrument column depend on the selection on the Names pop-up menu, just below the Map pop-up in the Drum Editor.



The options on this pop-up menu are the currently loaded drum maps plus a "GM Default" item which is always available. This means you can use the drum sound names in any loaded drum map without using I-notes and O-notes, if you want to.

The List Editor – Overview



The toolbar

The toolbar contains several items that are the same as in the Key Editor (edit solo, snap, quantize settings, etc.). These are described earlier in this chapter. The following toolbar items are unique to the List Editor:

- The Insert pop-up menu is used when creating new events. This is where you determine what type of event to add (see ["Inserting events"](#) on [page 190](#)).
- The Mask pop-up menu and Filter view (Show Filter View button) allow you to hide events from view, based on their type and other properties. See ["Filtering"](#) on [page 191](#).
- The Value View button can be used for hiding and showing the Value display (see below).

The List Editor has no info line (numerical editing is available in the list instead).

⇒ If you see an empty or incomplete list of items although the items are visible in the Key Editor, check if you have activated any filters (see ["Filtering"](#) on [page 191](#)).

The list

This lists all events in the selected MIDI part(s), in the order (from top to bottom) in which they are played back. You can edit the event properties by using regular value editing, see ["Editing in the list"](#) on [page 190](#).

The event display

This shows the events graphically. The vertical position of an event in the display corresponds to its entry in the list (i.e. to the playback order), while the horizontal position corresponds to its actual position in the project. This is where you add new parts or events, drag to move them, etc.

The value display

This display shows the "value" of each event, allowing for easy viewing and graphical editing. Typically, the value shown is the "Data 2" or "Value 2" property (amounts to MIDI controller events, velocity for notes, etc.). You can show or hide this display by clicking the "Show List Value View" button on the toolbar.

List Editor operations

Customizing the view

You can click and drag the divider between the list and the event display to make one area wider and the other narrower. Furthermore, the list can be customized in the following ways:

- You can change the order of the columns by dragging the column headings.
- You can resize columns by dragging the dividers between the column headings.

Setting the display format

Just like in the Project window, you set the display format (bars+beats, seconds, etc.) by right-clicking in the ruler and selecting an option from the pop-up menu. This setting affects both the ruler and all start, end and length values shown in the list.

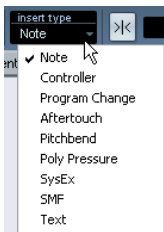
Zooming

You can change the horizontal magnification in the event display by using the zoom slider below the display or the Zoom tool (the magnification glass).

Inserting events

To add a new event to the edited part, proceed as follows:

1. Use the Insert pop-up menu on the toolbar to select the event type.



2. Select the Pencil tool and click in the event display at the desired position (relative to the ruler).

If you are creating note events, you can click and drag to set the length of the note.

The new event appears in the list and in the display. Its properties will be set to default values, but can be adjusted in the list.

- Notes will get the insert velocity value set in the insert velocity field on the toolbar. See [“Setting velocity values”](#) on [page 172](#).

Editing in the list

The list allows you to perform detailed numerical editing of the events' properties. The columns have the following functionality:

Column	Description
L	Locate column. An arrow in this column indicates the event that starts closest before the project cursor position. If you click in this column for an event, the project cursor is moved to the start of that event. Double-clicking moves the cursor position and starts/stops playback – useful for auditioning when editing in the list.
Type	The event type. This cannot be changed.
Start	The start position of the event, shown in the format selected for the ruler. Changing this is the same as moving the event. Note that moving the event past any other event in the list will re-sort the list (the list always shows the events in the order they are played back).
End	This is only used for note events, allowing you to view and edit the end position of a note (thereby resizing it).
Length	This is only used for note events. It shows the length of the note – changing this resizes the note and automatically changes the End value as well.
Data 1	This is the “data 1” or “value 1” property of the event. The content of this depends on the event type – for notes, this is the pitch, for example. Where applicable, the values are shown in the most relevant form. For instance, the Data 1 value for notes is shown as a note number in the format selected in the Preferences (Event Display–MIDI page). See also the table in the section “Editing in the value display” on page 192 .
Data 2	This is the “data 2” or “value 2” property of the event. The content of this depends on the event type – for notes, this is the velocity value, for example. See the table in the section “Editing in the value display” on page 192 .
Channel	The MIDI channel of the event. Note that this setting is normally overridden by the channel setting for the track. To make a MIDI event play back on “its own” channel, set its track to channel “Any” in the Project window.
Comment	This column is used for some event types only, providing an additional comment about the event.

- You can edit several events at once. If several events are selected and you edit a value for one event, the other selected events' values will be changed as well.

Normally, any initial value differences between the events will be maintained – i.e. the values will change by the same amount. If you press [Ctrl]/[Command] when you edit, however, all events will get the same value.

⇒ For SysEx (system exclusive) events, you can only edit the position (Start) in the list.
However, when you click the Comment column, the MIDI SysEx Editor opens, in which you can perform detailed editing of system exclusive events (see “Working with System Exclusive messages” on page 201).

Editing in the event display

The event display allows you to edit the events graphically using the tools on the toolbar. You can edit single events as well as several selected events simultaneously.

- To move an event, click and drag it to a new position. Note that moving the event past any other event in the display will re-sort the list (the list always shows the events in the order they are played back). As a result, the vertical position of the event in the display will change as well.
- To make a copy of an event, press [Alt]/[Option] and drag it to a new position.
- To resize a note, select it and drag its end point with the Arrow tool as in the Project window.
This only works with notes.

- To mute or unmute an event, click on it with the Mute tool.
You can mute or unmute several events in one go by enclosing them in a selection rectangle with the Mute tool.

- You can select a color scheme for the events with the Colors pop-up menu on the toolbar.
This affects how all MIDI events are shown in the List, Key and Drum editors – see “Coloring notes and events” on page 171.

- To delete an event, select it and press [Backspace] or [Delete], or click on it with the Eraser tool in the event display.

Filtering



Clicking the “Show Filter View” button on the toolbar opens an additional filter bar that allows you to hide specific event types from view. For example, it may be hard to find note events if the part contains a lot of controllers. By hiding these, the list becomes more manageable.

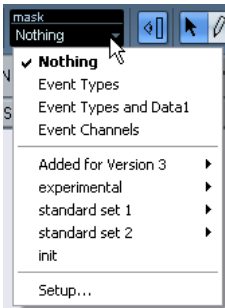
- To hide an event type, activate its checkbox on the filter view.
- To see one event type only (hide all other event types), press [Ctrl]/[Command] and click its checkbox. If you [Ctrl]/[Command]-click again, all checkboxes are cleared (all events will be visible).

⇒ The event types remain hidden even if you close the filter view.

To make sure you see all events, open the filter view and check that all checkboxes are deactivated.

⇒ The filter view does not remove, mute or change the events in any way.

Masking



The Mask function is similar to the filter view but allows you to hide events based on other criteria as well. Proceed as follows:

1. Select an event (or several events) of the type you want to view.
2. Pull down the Mask pop-up menu on the toolbar and select one of the options.

The results are as follows:

Option	Description
Event Types	Only events with the type of the selected event will be shown. This does the same as the filter view but is quicker if you only want to view a single event type.
Event Types and Data 1	Only events of the same type and with the same “Data 1” value will be shown. For example, if a note event is selected, only notes with the same pitch will be shown. If a controller event is selected, only controllers of the same type will be shown.
Event Channels	Only events with the same MIDI channel value as the selected event will be shown.

In addition to the above options, the menu also gives you access to the Logical Editor presets.

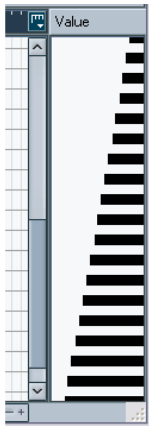
When you apply any of the Logical Editor presets to create masking settings yourself, only the events that meet the criteria specified will be visible.

- To deactivate the Mask function, select “Nothing” from the Mask pop-up menu.

The most typical usage of the Mask function is to view a certain type of controller only (e.g. Modulation, Breath Control, etc.). Since these are all the same event types (controller), this would not be possible using the filter view. With the “Event Types and Data 1” option on the Mask pop-up menu, it is!

Editing in the value display

The value display to the right of the event display is a tool for quick viewing and editing of multiple values, e.g. velocities or controller amounts. The values are shown as horizontal bars, with the bar length corresponding to the value.



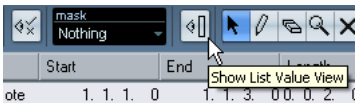
A velocity ramp in the value display.

You edit the values by clicking and dragging. Note that the pointer automatically takes on the shape of the Pencil tool when you move it into the value display – you don't have to select the Pencil tool for this.

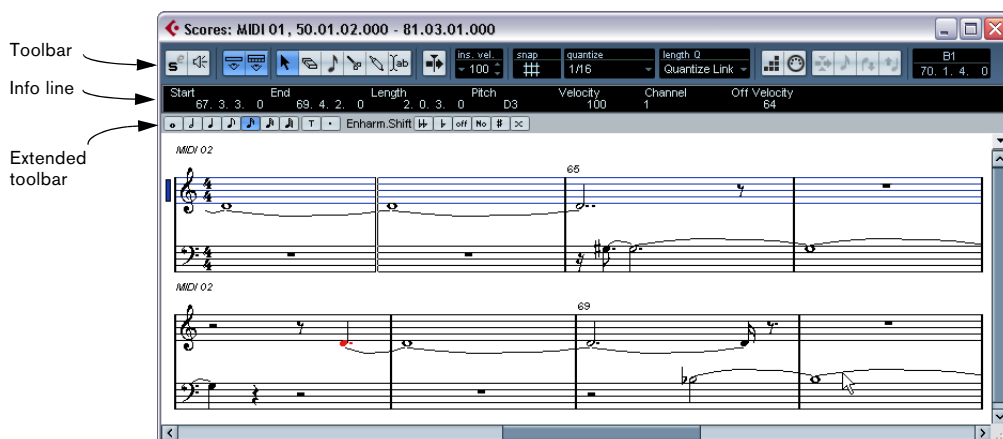
Exactly which value is shown for an event depends on the event type. The following table shows what is displayed and edited in the Data columns and the value display:

Event type	Data 1	Data 2	Value display
Note	Pitch (note number)	Velocity	Velocity
Controller	Controller type	Controller amount	Controller amount
Program Change	Program number	Not used	Program number
Aftertouch	Aftertouch amount	Not used	Aftertouch amount
Pitch Bend	Bend amount	Not used	Bend amount
SysEx	Not used	Not used	Not used

- The value display can be hidden from view by clicking the “Show List Value View” button on the toolbar, so that it is not lit.



The Score Editor – Overview



The Score Editor shows the MIDI notes as a musical score. The window contains the following sections and items:

The toolbar

The Score Editor toolbar is similar to the toolbar in the Key Editor, with the following differences:

- The Score Editor toolbar has a button for showing or hiding the extended toolbar (see below).
- There are no active part settings – in the Score Editor, parts on different tracks are shown on different staves.
- There are no chord recognition functions.

The info line

The info line shows information about selected MIDI notes, just like in the Key and Drum Editors. You can edit all values on the info line using regular value editing (see [“Editing on the info line”](#) on [page 176](#) for details).

- To hide or show the info line, click the “Show Info” button in the toolbar.

The extended toolbar



The extended toolbar (shown or hidden by clicking the “Show Tool Strip” button on the main toolbar) contains the following items:

Note value buttons

Click one of these to select a note value for input. The “T” and “.” options are for triplet and dotted note values. You can also press [Ctrl]/[Command] and click one of the note value buttons – this will resize all selected notes to the note value you choose.

Enharmonic shift

Allows you to manually select whether a note should be shown with flat or sharp accidentals. See [“Enharmonic Shift”](#) on [page 199](#).

The score display



The main area of the Score Editor window shows the notes in the edited parts on one or several staves.

- If you are editing one or several parts on the same track, as much of them as possible is shown on several staves – one above the other – just as with a score on paper.

- If you are editing parts on several tracks, they are put on a grand staff (multiple staves, tied together by bar lines).

- The number of measures across the screen depends on the size of the window and the number of notes in each measure.

The maximum number of bars across the page is four.

- The end of the last part is indicated by a double bar line.

- Unlike the other MIDI editors, the Score Editor does not have a ruler.

A conventional ruler would not make sense, since there is no exact relationship between a note's horizontal position in the score and its musical position in the Project.

Score Editor operations

Opening the Score Editor

To open one or several parts in the Score editor you proceed as with the other editors: select one or several tracks or any number of parts (on the same or different tracks), and select "Open Score Editor" from the Scores submenu on the MIDI menu. The default key command for this is [Ctrl]/[Command]+[R].

- You can also select the Score editor as your default editor, allowing you to open it by double-clicking parts.

This is done with the Default Edit Action pop-up menu in the Preferences dialog (Event Display—MIDI page).

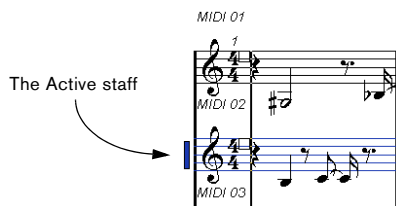
About editing parts on different tracks

If you have selected parts on two or more tracks and open the Score editor, you will get one staff for each track (although you can split a staff in two, e.g. when scoring for piano). The staves are tied together by bar lines and placed in the order of the tracks in the Project window.

- If you need to rearrange the staves: close the editor, go back into the Project window, drag the tracks to the order you want them, and open the Score Editor again.

The Active Staff

Just as in the other editors, all MIDI input (as when recording from your instrument) is directed to one of the tracks, here called the Active staff. The Active staff is indicated by a rectangle in the left part of the first visible bar.



To change the active staff, click in the staff you want to activate.

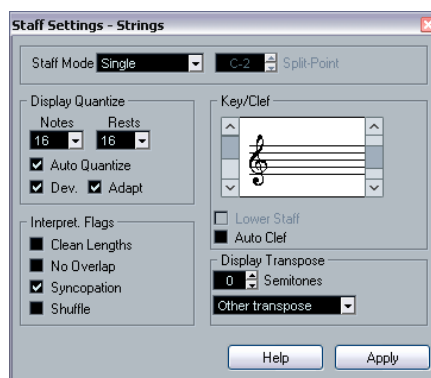
Getting the score displayed correctly

When you open the Score Editor for a part recorded in real time, the score may not look as legible as you expect. The Score Editor can ignore the minor time variances in performance and make a neater score almost instantly. To achieve this, there are a number of Staff Settings that determine how the program displays the music.

⇒ Note that the time signature follows the time signature(s) on the Tempo track and are common to all tracks/staves in the score.

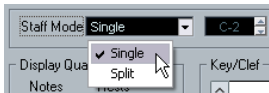
There are two ways to open the Staff Settings dialog:

- Double-click in the area to the left of the staff.
- Activate a staff by clicking in it, and select "Staff Settings..." from the Scores submenu on the MIDI menu. The Staff Settings dialog appears.



⚠ The settings you make in this dialog are independent for each staff (track), but common for a piano staff which you have created by choosing the "Split" Staff Mode option (see below).

Staff Mode



This pop-up determines how the staff should be shown:

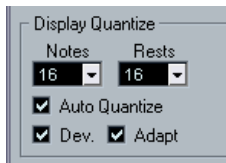
- When set to “Single”, all notes in the part are shown in the same staff.
- When set to “Split”, the part is split on the screen into a bass and treble clef, as in a piano score.

You use the Split-Point value field to set the note where you want the split to occur. Notes above and including the split note will appear on the upper staff, and notes below the split note will appear on the lower staff.



Before and after setting a split at C3.

Display Quantize



Notes are not an absolute language, and you must give the program a few hints on how the score should be displayed. This is done using the Display Quantize section of the Staff Settings dialog.

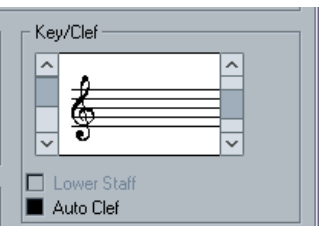
- ⚠ These are only display values used for the graphics in the Score Editor. They do not affect the actual playback in any way.

Here is a description of the functions:

Parameter	Description
Notes	Determines the smallest note value to be displayed and the “smallest position” to be recognized and properly displayed. Set this to the smallest significant note position used in your music. For example, if you have notes on odd sixteenth note positions, you should set this value to 16. The “T” values are for triplet note values. This setting is partly overridden by Auto Quantize (see below).
Rests	This value is used as a “recommendation” – the program will not display rests smaller than this value, except where necessary. In effect, this setting also determines how the length of notes should be displayed. Set this value according to the smallest note value (length) you want to be displayed for a single note, positioned on a beat.
Auto Quantize	Generally, if your music contains mixed triplets and straight notes, try activating this checkbox. Otherwise, make sure it is deactivated. Auto Quantize uses involved methods to make your score look as legible as possible. Auto Quantize allows you to mix straight notes with triplets (triplets) in a part. But, Auto Quantize also uses the (display) Quantize value. If it can't find an appropriate note value for a certain note or group of notes, it will use the set Quantize value to display it. If the part is imprecisely played and/or complex, Auto Quantize may have a problem “figuring out” exactly what you “mean”.
Dev	This option is only available if Auto Quantize is on. When Dev (Deviation) is activated, triplets/straight notes will be detected even if they are not exactly “on the beat”. However, if you know your triplets/straight notes are perfectly recorded (quantized or entered by hand), turn this off.
Adapt	This option is only available if Auto Quantize is on. When Adapt is activated, the program “guesses” that when one triplet is found, there are probably more triplets surrounding it. Turn this on if not all of your triplets are detected.

Key and Clef

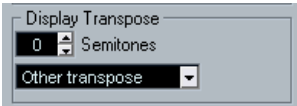
The correct Key and Clef are set using the two scroll bars in the Key & Clef section.



If you activate the “Auto Clef” checkbox, the program attempts to guess the correct clef, judging from the pitch of the music.

- To set the clef and key for the lower staff, activate the “Lower Staff” checkbox in the Key/Clef section.

Display Transpose



Some instruments, for example a lot of brass instruments, are scored transposed. For this purpose, the Staff Settings dialog allows you to specify a separate Display Transpose setting for each staff (track). This transposes the notes in the score (i.e. how they are displayed) without affecting how the notes play back. This allows you to record and play back a multi staff arrangement, and still score each instrument according to its own transposition.

- Use the pop-up menu to select the instrument for which you are scoring.
You can also manually set a display transpose value with the Semitones box above.

Interpret. Flags

These provide additional options for how the score should be displayed:


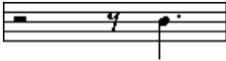
Parameter	Description
Clean Lengths	When this is activated, notes that are considered to be chords will be shown with identical lengths. This is done by showing the longer notes as shorter than they are. When Clean Lengths is turned on, notes with very short overlaps are also cut off; a bit as with No Overlap (see below), but with a more subtle effect.
No Overlap	When this is activated one note will never be shown as overlapping another, lengthwise. This allows long and short notes starting at the same point to be displayed without ties; the long notes are cut off in the display. This will make the music more legible.



An example measure with No Overlap deactivated...



...and with No Overlap activated.

Parameter	Description
Syncopation	When this function is activated, syncopated notes are shown in a more legible way.  <p>This is a dotted quarter at the end of a bar when Syncopation is Off...</p>  <p>...and when it is On.</p>
Shuffle	Activate this function when you have played a shuffle beat and want it displayed as straight notes (not triplets). This is very common in jazz notation.

Applying your settings

After you've made your settings, click Apply to apply them to the active staff. You can select another staff in the score and make settings for that, without having to close the Staff Settings dialog first – just remember to click Apply before you change staff, otherwise your changes will be lost.

Entering notes with the mouse

To enter notes into a part in the Score Editor, you use the Note tool. However, first you need to set the note value (length) and spacing:

Selecting a note value for input

This can be done in two ways:

- By clicking the note symbols on the extended toolbar.
You can select any note value from 1/1 to 1/64th and turn on and off the dotted and triplet options by clicking the two buttons to the right. The selected note value is displayed in the Length value field on the toolbar and in the Note tool cursor shape.
- By selecting an option from the Length Q pop-up on the toolbar.

Selecting a Quantize Value

When you move the mouse pointer over the score, you will see that the position box on the toolbar tracks your movement and shows the current position in bars, beats, sixteenth notes and ticks.

Positioning on screen is controlled by the current Quantize value. If you for example set this to “1/8 Note” you can only insert and move notes to eighth note positions, at quarter notes, at half bars or at bar positions. It is a good strategy to set the Quantize value to the smallest note value in the piece. This doesn't stop you from inputting notes at “coarser” positions. However, if you set the Quantize value to too small a note value, it is easier to make mistakes.



With the quantize value set to “1/8 Note”, you can only input notes at eighth note positions.

The Quantize value is set with the Quantize pop-up on the toolbar.

- You can also assign key commands to the different Quantize values.

This is done in the Key Commands dialog on the File menu, under the heading “MIDI Quantize”.

- Just like in the other MIDI editors, you can use the Quantize Setup dialog to create other quantize values, irregular grids, etc.

However, this is not often used when entering score notes.

Entering a note

To add a note to the score, proceed as follows:

1. Make the staff active.

Notes are always put in on the active staff.

2. Select the type of note by selecting a note value.

This is described in detail above.

3. If you selected the note value by clicking on a symbol on the extended toolbar, the Note tool was automatically selected – otherwise select the Note tool from the toolbar or Quick menu.

4. Select a Quantize value.

As described above, the Quantize value will determine the spacing between notes. If you have Quantize set to “1/1 Note” you will only be able to add notes at downbeats. If you set Quantize to “1/8 Note” you will be able to add notes at all eighth note positions etc.

5. Click in the staff and keep the mouse button pressed.

A note appears under the mouse pointer.

6. Move the mouse horizontally to find the correct position.

Check the lower mouse position box on the toolbar – the position is “magnetically” attracted to the grid defined by the current Quantize value. This allows you to easily find the correct position.

7. Move the mouse vertically to find the correct pitch.

The upper mouse position box shows the pitch at the pointer position, making it easy to find the right pitch.

8. Release the mouse button.

The note appears in the score.

The notes you enter will get the insert velocity value set in the insert velocity field on the toolbar. See “[Setting velocity values](#)” on [page 172](#).

Selecting notes

There are several ways to select notes in the Score Editor:

By clicking

To select a note, click on its note head with the Arrow tool. The note head gets red to indicate that it is selected.

- To select more notes, hold down [Shift] and click on them.
- To deselect notes, hold [Shift] down and click on them again.
- If you hold down [Shift] and double-click on a note, this note and all the following notes in the same staff are selected.

Using a selection rectangle

1. Press the mouse button with the Arrow tool in some free (white) space in the score.

2. Drag the mouse pointer.

A rectangle appears. You can drag to select voices on several voices or staves if you wish.

3. Release the mouse button.

All notes with their note heads inside the rectangle get selected.

If you want to deselect one or more of the notes, hold down [Shift] and click as described above.

Using the keyboard

By default, you can step through the notes in the staff using the left and right arrow keys. If you press [Shift], you will select the notes as you step through them.

- If you want to use other keys for selecting notes, you can customize the settings in the Key Commands dialog on the File menu (in the Navigate category).

Deselecting everything

To deselect everything, simply click with the Arrow tool in some “free” (white) space in the score.

Deleting notes

Notes can be deleted in two ways:

Using the Eraser tool

1. Select the Eraser tool from the toolbar or Quick menu.
2. Click on the Note(s) you want to erase, one at a time or drag over them with the mouse button pressed.

Using the keyboard or delete menu item

1. Select the notes you want to delete.
2. Select Delete from the Edit menu, or press [Delete] or [Backspace] on the computer keyboard.

Moving notes

To move or transpose notes, proceed as follows:

1. Set the Quantize value.

The Quantize value will restrict your movement in time. You can not place the notes on positions smaller than the Quantize value. If Quantize for example is set to “1/8 Note”, you will not be able to move the notes to a sixteenth note position. However, you will be able to put them on any eighth note, quarter note, half note or whole note position.

2. If you want to hear the pitch of the note while moving, activate the speaker icon on the toolbar.

When it is on, you will hear the current pitch of the “dragged” note.

3. Select the note(s) you plan to move.

4. Click one of the selected notes and drag it to a new position and/or pitch.

The horizontal movement of the note is “magnetically attracted” to the current Quantize value. The position boxes on the toolbar show what the new position and pitch for the dragged note will be.

5. Release the mouse.

The notes appear at their new position.

- If you press [Ctrl]/[Command] and drag, movement is restricted to vertical or horizontal only (depending on in which direction you drag).

- You can also move selected notes by using key commands, as assigned in the Nudge category in the Key Commands dialog.

When moving notes to the left or right using key commands, the notes will be moved in steps according to the current Quantize value. The keys assigned for up/down nudging will transpose notes in semitones steps.

Duplicating notes

1. Set the Quantize value and select the notes, as for moving.
2. Press [Alt]/[Option] and drag the notes to their new position.

- If you want to restrict movements to one direction only, press [Ctrl]/[Command].

This works just as for moving, as described above.

- [Alt]/[Option] is the default modifier key for copying/duplicating. If you like, you can change this in the Preferences dialog (Editing–Tool Modifiers page).

The entry for this is found in the Drag & Drop category (“Copy”).

Changing the length of notes

As described earlier (see [“Getting the score displayed correctly”](#) on [page 194](#)), the displayed length of a note isn’t necessarily the actual note length, but also depends on the Note and Rest Display Quantize settings in the Staff Settings dialog. This is important to remember when you change the length of a note, since it can give rise to confusing results.

There are several ways to change the length of a note in the Score Editor:

By using the Note tool

1. Select a Note value that you wish to apply to the Note. This can be done by clicking a note value icon in the extended toolbar or by selecting a new Length value.
2. Select the Note tool if it isn’t already selected.
3. Hold down [Alt]/[Option] and click on the notes you wish to set to this length.

By using the note value icons on the extended toolbar

Using the extended toolbar is another quick way to set a number of notes to the same length:

1. Select the notes you want to change.
2. Hold down [Ctrl]/[Command] and click on one of the note icons on the extended toolbar.

All the selected notes are now given the length of the clicked note.

By using the info line

You can also edit length values numerically on the info line, just like in the Key and Drum Editors (see [“Editing on the info line”](#) on [page 176](#)).

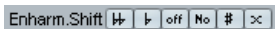
Splitting and Gluing notes

- If you have two notes strung together by a tie, and click on the “tied” note head with the Scissors tool, the note will be divided into two, with the respective length of the “main” and the tied note.
- Conversely, if you click on a note with the Glue Tube tool it will be joined to the next note with the same pitch.

Enharmonic Shift

The buttons to the right on the extended toolbar allow you to shift the display of selected notes so that for example an F# (F sharp) is instead shown as a Gb (G flat) and vice versa:

1. Select the note(s) you want to affect.
2. Click on one of the buttons to display the selected note(s) a certain way.



The “off” button resets the notes to original display. The other five options are double flats, flats, No (no accidentals shown, regardless of pitch), sharps and double sharps.

Flip Stems

Normally the direction of the note stems is automatically selected according to the note pitches, but you can change this manually if you like:

1. Select the notes for which you want to change (flip) the stem direction.
2. Pull down the MIDI menu and select Flip Stems from the Scores submenu.

Working with text

You can use the Text tool to add comments, articulation or instrumentation advice and other text strings anywhere in the score:

Adding a text string

1. Select the Text tool from the toolbar or Quick menu.



2. Click anywhere in the score.
A text input line dialog box appears.
3. Enter the text and press [Return].

Editing text

To edit an already added text string, double-click it with the Arrow tool. This opens the text for editing, and you can use the arrow keys to move the cursor, delete characters with the [Delete] or [Backspace] keys and type new text as usual. Finish by pressing [Return].

- To delete a text block, select it with the Arrow tool and press [Backspace] or [Delete].
- You can move or duplicate text blocks by dragging (or [Alt]/[Option]-dragging) them, just as with notes.

Changing the text font, size and style

To change the font settings for the text you have added, proceed as follows:

1. Select the text block by clicking it with the Arrow tool.
2. Pull down the MIDI menu and select “Set Font” from the Scores submenu.

A Font Settings dialog appears, containing the following settings:

Item	Description
Font	This is where you specify the font for the text. Which fonts are available on the pop-up menu depends on which fonts you have installed on you computer. You probably don't want to use the “Steinberg” fonts – these are special fonts used by the program (e.g. for score symbols) and not suited for common text.
Size	Sets the size of the text.
Frame	Allows you to encase the text in a rectangular (box) or oval frame.
Text style options	These checkboxes determine whether the text should be bold, italic, and/or underlined.

3. When you've made your settings, click Apply.

If you like, you can leave the Font Settings dialog open, select another text block and adjust the settings for that – just remember to click Apply before you select a new text block.

- If you make settings in the Font Settings dialog with no text block selected, the settings will be used as default for all new text.

In other words, all text you enter from then on will get the settings you have specified (although you can of course change this manually for each text block as usual).


Printing

To print your score, proceed as follows:

1. Open the parts you want to print in the Score Editor.

Printing is only available from within the Score Editor.

2. Select Page Setup from the File menu and make sure all your printer settings are correct. Close the dialog.

 If you change your setting for paper size, scale and margins now, the score may change its look.

3. Select Print from the File menu.

4. The standard Print dialog appears. Fill out the options as desired.

5. Click Print.

Introduction

SysEx (System Exclusive) messages are model-specific messages for setting various parameters of a MIDI device. This makes it possible to address device parameters that would not be available via normal MIDI syntax.

Every major MIDI manufacturer has its own SysEx identity code. SysEx messages are typically used for transmitting patch data, i.e. the numbers that make up the settings of one or more sounds in a MIDI instrument.

Cubase AI allows you to record and manipulate SysEx data in various ways. This chapter points to various features that help you manage and create SysEx data.

Bulk dumps

Recording a bulk dump in Cubase AI

In any programmable device, the settings are stored as numbers in computer memory. Change those numbers, and you will change the settings.

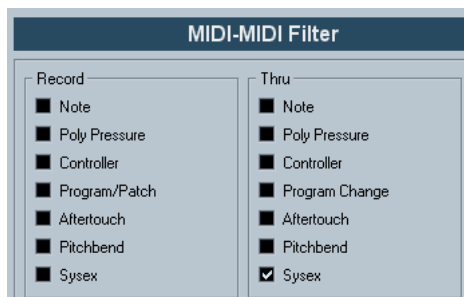
Normally, MIDI devices allow you to dump (transmit) all or some settings in the device's memory in the form of MIDI SysEx messages. A dump is therefore (among other things) a way of making backup copies of the settings of your instrument: sending such a dump back to the MIDI device will restore the settings.

If your instrument allows the dumping of a few or all of its settings via MIDI by activating some function on the front panel, this dump will probably be recordable in Cubase AI.

1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase AI menu) and select the MIDI-MIDI Filter page.

This allows you to govern which MIDI event types should be recorded and/or thru-put.

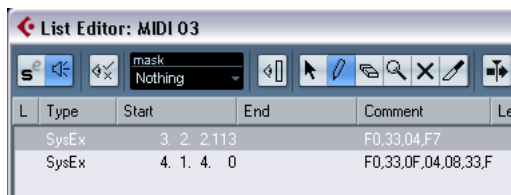
2. Make sure that recording of Sysex data is not filtered, by unchecking the the Sysex checkbox in the Record section. The Sysex checkbox in the Thru section can be left as it is (by default activated).



This way, SysEx messages will be recorded but not echoed back out to the instrument (which may lead to unpredictable results).

3. Activate recording on a MIDI track and initiate the dump from the front panel of the instrument.
4. When done recording, select the new part and open the List Editor from the MIDI menu.

This allows you to check that the SysEx dump was recorded – there should be one or several SysEx events in the part/event list.



- ⚠ If your MIDI instrument doesn't offer a way to initiate a dump "by itself", you have to send a Dump Request message from Cubase AI to start the dump. In that case, use the MIDI SysEx Editor (see ["Editing System Exclusive messages"](#) on [page 203](#)) to insert the specific Dump Request message (see the instrument's documentation) at the beginning of a MIDI track. When you activate recording, the Dump Request message will be played back (sent to the instrument), the dump will start and be recorded as above.

Transmitting a bulk dump back to a device

1. Make sure the MIDI track with the System Exclusive data is routed to the device.

You may want to check your device's documentation to find details about which MIDI channel should be used, etc.

2. Solo the track.

This might not be necessary, but it is a good safety measure.

3. Make sure the device is set up to receive SysEx messages (often, receiving SysEx is turned off by default).

4. If necessary, put the device in "Standby to Receive System Exclusive" mode.

5. Play back the data.

Some advice

- Don't transmit more data than you need. If all you want is a single program, don't send them all, it will only make it harder to find the one you want. Usually, you can specify exactly what you want to send.
- If you want the sequencer to dump the pertinent sounds to your instrument each time you load a project, put the SysEx data in a silent "count-in" before the project itself starts.
- If the dump is very short (for instance, a single sound) you can put it in the middle of the project to re-program a device on the fly. However, you can achieve the same effect by using Program Change. This is definitely preferable, since less MIDI data is sent and recorded. Some devices may be set up to dump the settings for a sound as soon as you select it on the front panel.
- If you create parts with useful "SysEx dumps", you can put these on a special muted track. When you want to use one of them, drag it to an empty unmuted track and play it back from there.
- Do not transmit several SysEx dumps to several instruments at the same time.
- Make a note of the current device ID setting of the instrument. If you change this, the instrument may refuse to load the dump later.

Recording System Exclusive parameter changes

Often you can use SysEx to remotely change individual settings in a device, e.g. open a filter, select a waveform, change the decay of the reverb etc. Many devices are also capable of transmitting changes made on the front panel as SysEx messages. These can be recorded in Cubase AI, and thus incorporated into a regular MIDI recording.

Here's how it works: let's say you open up a filter while playing some notes. In that case, you will record both the notes and the SysEx messages generated when you opened of the filter. When you play it back, the sound changes exactly like it did when you recorded it.

1. Open the Preferences dialog from the File menu, select the MIDI-MIDI Filter page and make sure that SysEx is recorded, i.e. the Sysex checkbox in the Record section is deactivated.

2. Make sure the instrument is actually set to transmit changes of front panel controls as SysEx messages.

3. Record normally.

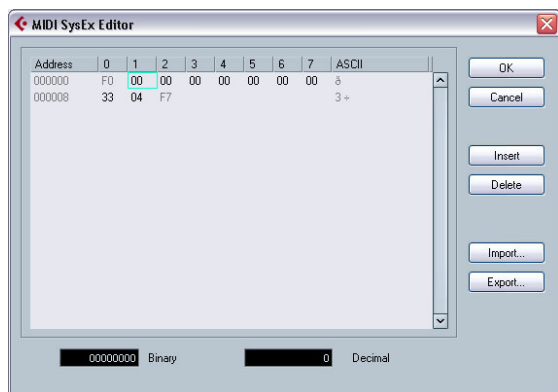
When you're done, you can check that the events were recorded properly in the List Editor.

Editing System Exclusive messages

While SysEx events are shown in the List Editor, their entire content is not (only the beginning of the message is displayed in the Comment column for the event). Also, you cannot edit the event (other than moving it) as you can with other event types in the List Editor.

Instead, you have to use the MIDI SysEx Editor for this.

- To open the MIDI SysEx Editor for an event, click in the Comments column for the event in the List Editor.



The display shows the entire message on one or several lines. SysEx messages always begin with F0 and end with F7 with a number of arbitrary bytes in between. If the message contains more bytes than fit on one line, it continues on the next. The Address indication to the left helps you find out on which position in the message a certain value resides.

You can edit all values except for the first (F0) and last one (F7).

Selecting and viewing values

To select a value, either click on it or use the cursor keys. The selected byte is displayed in various formats:

- In the main display, values are shown in hexadecimal format.
- To the right of this, values are shown in ASCII format.
- At the bottom of the dialog, the selected value is shown in binary and decimal formats.

Editing a value

The selected value can be edited directly in the main display or in the decimal and binary displays. Just click on it and type in the desired value as usual.

Adding and deleting bytes

Using the Insert and Delete buttons or their corresponding computer keyboard keys, you can add and delete bytes from the message. Inserted data will appear before the selection.

To delete the complete SysEx message, select it in the List Editor and press [Delete] or [Backspace].

Importing and exporting data

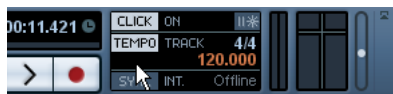
The Import and Export buttons allow you to get SysEx data from disk and to export the edited data to a file. The file has to be in "MIDI SysEx" (.SYX) binary format. Only the first dump in a .SYX file will be loaded.

This format should not be confused with MIDI files, which have the extension .MID.

Background

The tempo can either be fixed through the whole project (this is called “Fixed tempo mode”) or follow the Tempo track (this is called “Tempo track mode”), which may contain tempo changes.

- To switch between Fixed tempo mode and Tempo track mode, use the Tempo button on the Transport panel:



When the Tempo button is lit (and the text “Track” is shown), the tempo follows the Tempo track; when it is deactivated (and the text “Fixed” is shown), the Fixed tempo is used (see [“Setting the Fixed tempo”](#) on [page 209](#)). You can also switch tempo mode in the Tempo Track Editor (see below).

In Tempo track mode, the tempo cannot be changed on the Transport panel, i.e. the tempo information here is for display purposes only.

The Tempo track also contains time signature events. These are always active, regardless of whether Fixed tempo mode or Tempo track mode is selected.

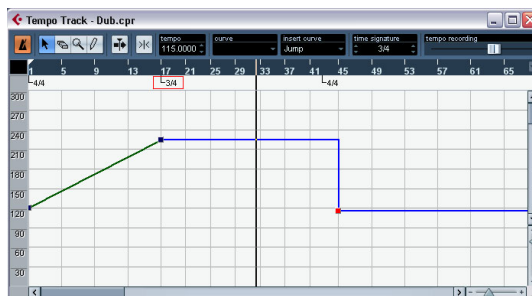
A note about audio tracks in a tempo-based project

The start time position of audio events depends on the current tempo setting. However, it is important to realize that the actual audio (“within” the events) will play back as recorded, regardless of any tempo changes you make. Therefore, it’s good practice to make the proper tempo and time signature settings before you start recording tempo-based audio.

⇒ To make an already recorded audio track follow the tempo changes, you can use the Hitpoints and Slicing features, see [“Working with hitpoints and slices”](#) on [page 121](#). How well this works depends on the character of the audio recordings, since the Hitpoint detection feature works best with fairly rhythmical material.

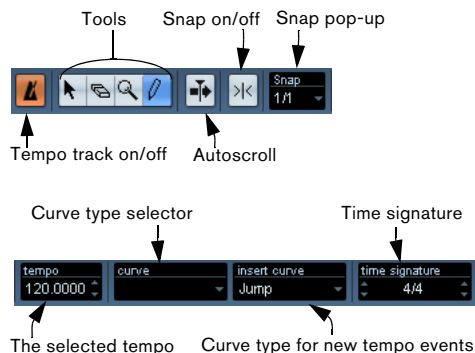
The Tempo Track Editor – Overview

To make changes to the actual Tempo track, you need to open the Tempo Track Editor by selecting “Tempo Track” on the Project menu.



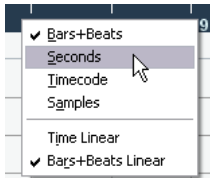
The toolbar

The toolbar contains various tools and settings. The tempo and time signature displays to the right allow you to view and edit the value of the selected tempo curve point or time signature event, much like the info line in other editors.



The ruler

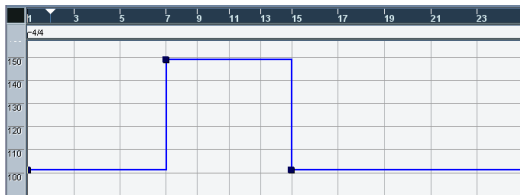
The ruler in the Tempo Track Editor shows the timeline. As in other windows, you can select a display format by clicking on the arrow button to the right of the ruler and selecting an option from the pop-up menu that appears.



The two additional items at the bottom of the menu have the following functionality:

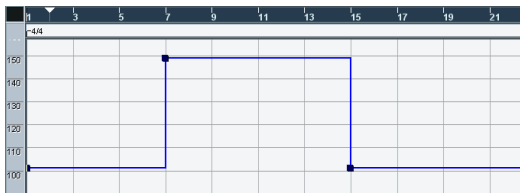
- If “Time Linear” is selected, the ruler, time signature area and tempo curve display will be linear in relation to the timeline.

This means that if the ruler shows bars and beats, the distance between the bar lines will vary depending on the tempo.



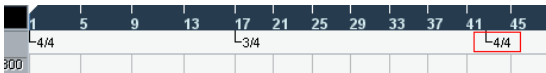
- If “Bars+Beats Linear” is selected, the ruler, time signature area and tempo curve display will be linear in relation to beats.

If the ruler shows bars and beats, the distance between beats will be constant.

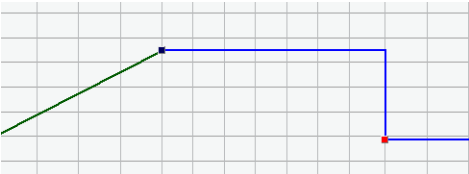


The time signature area

The area below the ruler contains time signature events.



The tempo curve display



The main display shows the tempo curve (or, if Fixed tempo mode is selected, the Fixed tempo – see “[Setting the Fixed tempo](#)” on [page 209](#)). To the left of the display is a tempo scale to help you quickly locate the desired tempo.

- Note that the vertical “grid lines” correspond to the display format selected for the ruler.

Operations

Zooming

Changing the magnification is done using any of the following methods:

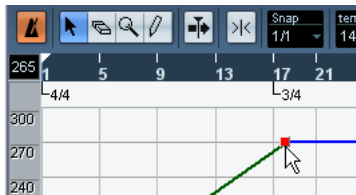
- By using the zoom sliders in the lower right corner of the window.
- By using the Magnifying Glass tool.
This works according to the standard procedures.
- By using the Zoom submenu on the Edit menu.
The options on the menu work as in other windows.

Editing the tempo curve

⚠ This section assumes that you are working in Tempo track mode, i.e. the Tempo button must be activated on the Transport panel.

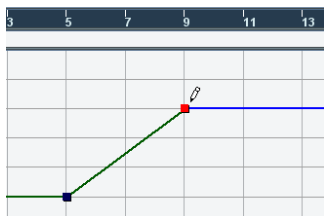
Adding tempo curve points

1. Use the “insert curve” pop-up menu in the toolbar to select whether you want the tempo to change gradually from the previous curve point to the new one (“Ramp”) or change instantly to the new value (“Jump”).
2. Select the Pencil tool.
3. Click at the desired time position in the tempo curve display, and keep the mouse button pressed. If Snap is activated on the toolbar, this determines at which time positions you can insert tempo curve points, see “Snap” on page 210.

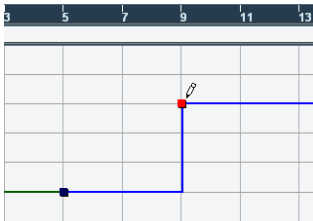


When you click, the tempo display in the toolbar shows the tempo value.

4. Drag the curve point to the desired tempo value (indicated in the tempo display), and release the mouse button. The tempo curve point is inserted. The result depends on whether you selected “Ramp” or “Jump” in step 1 above.



Insert curve set to “Ramp”



Insert curve set to “Jump”

- You can also just click and draw a tempo curve with the Pencil tool, so that curve points are inserted while you draw. For this, the “Ramp” Insert Curve mode is useful.
- Instead of using the Pencil tool, you can press [Alt]/[Option] and use the Arrow tool. This will only insert a single point (i.e. you cannot draw a curve with the Arrow tool).

Selecting tempo curve points

Selecting curve points is done using any of the following methods:

- Use the Arrow tool. The standard selection techniques apply.
- Use the Select submenu on the Edit menu. The options are:

Option	Description
All	Selects all curve points on the Tempo track.
None	Deselects all curve points.
In Loop	Selects all curve points between the left and right locator.
From Start to Cursor	Selects all points to the left of the project cursor.
From Cursor to End	Selects all points to the right of the project cursor.

- You can also use the left and right arrow keys on the computer keyboard to go from one curve point to the next. If you press [Shift] and use the arrow keys, the current selection will be kept, allowing you to select several points.

Editing tempo curve points

Curve points can be edited in the following ways:

- By clicking and dragging horizontally and/or vertically. If several points are selected, all of them are moved. If Snap is activated on the toolbar, this determines to which time positions you can move curve points, see “Snap” on page 210.

- By adjusting the tempo value in the tempo display on the toolbar.

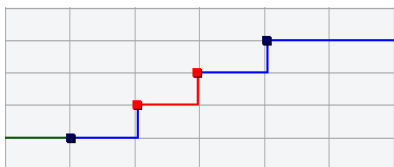
For this to work, a single tempo curve point must be selected.

⚠ Dragging tempo curve points with a time-based display format (any other format than “Bars+Beats”) may lead to confusing results. This is because moving a point will change the relationship between tempo and time. For example, let's say you move a tempo point to the right and drop it on a certain time position. When you release the mouse button, the mapping between tempo and time will be adjusted (since you have changed the tempo curve). As a result, the moved point will appear at another position. For this reason, we recommend that you use the Bars+Beats display format when editing tempo curves.

Adjusting the curve type

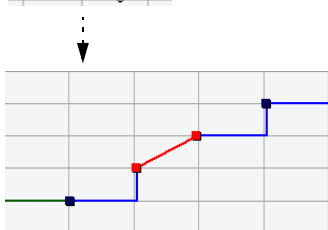
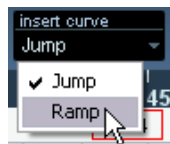
You can change the curve type of a tempo curve segment at any time, using the following method:

1. Select all curve points within the segment you want to edit.



2. Pull down the Curve pop-up menu on the toolbar and select “Jump” or “Ramp”.

The curve sections between the selected points are adjusted.

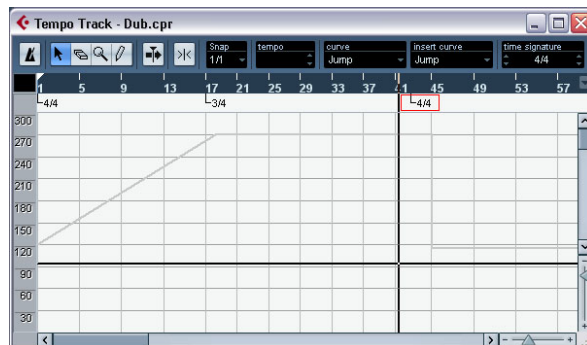


Removing tempo curve points

To remove a curve point, either click on it with the Eraser tool or select it and press [Backspace]. The first tempo curve point cannot be removed.

Setting the Fixed tempo

When the Tempo track button is deactivated, the Tempo track curve is greyed out (but still visible). Since the Fixed tempo is constant throughout the whole project, there are no tempo curve points. Instead, the Fixed tempo is displayed as a horizontal black line in the tempo curve display.



There are three ways to set the tempo in Fixed mode:

- Drag the tempo line up or down with the Arrow tool.
- Adjust the value numerically in the tempo display on the toolbar.
- On the Transport panel, in Fixed tempo mode, click on the Tempo value to select it, enter a new value and press the [Enter] key.

Adding and editing time signature events

- To add a time signature event, click in the time signature area with the Pencil tool.

This adds a default 4/4 time signature event at the closest bar position. You can also do this by pressing [Alt]/[Option] and clicking with the Arrow tool.

- To edit the value of a time signature event, select it and adjust the value in the signature display on the toolbar. Note that there are two thumbwheel controls for the signature display; the left one adjusts the numerator and the right one adjusts the denominator.

- You can move a time signature event by clicking and dragging it with the Arrow tool.

Again, note that time signature events can only be positioned at the start of bars.

- To remove a time signature, either click on it with the Eraser tool or select it and press [Backspace].

The first time signature event cannot be removed.

Options and settings

Snap

You activate or deactivate Snap by clicking the Snap icon on the toolbar. The behavior of the function depends on the display format selected for the ruler:

- If “Bars+Beats” is selected, tempo curve points will snap to the set resolution on the Snap pop-up. If this is set to 1/1, curve points will snap to the start of bars.
- If any other display format is selected, tempo curve points will snap to the vertical grid lines in the tempo curve display.

The spacing of the grid lines depends on the horizontal magnification.

- Time signature events can only be positioned at the start of bars, regardless of whether Snap is activated or not.

Autoscroll

When this option is activated, the tempo curve display will scroll during playback, keeping the project cursor visible.

Introduction

The Export Audio Mixdown function in Cubase AI allows you to mix down audio from the program to a file on your hard disk, in a number of formats.

You always mix down an output bus. For example, if you have set up a stereo mix with tracks routed to a stereo output bus, mixing down that output bus would give you a mixdown file containing the whole mix.

Notes

- The Export Audio Mixdown function mixes down the area between the left and right locator.
- When you mix down, you get what you hear – mutes, mixer settings and insert effects are taken into account. Note though that you will only include the sound of the bus you select for mixdown.

- MIDI tracks are not included in the mixdown!

To make a complete mixdown containing both MIDI and audio, you first need to record all your MIDI music to audio tracks (by connecting the outputs of your MIDI instruments to your audio inputs and recording, as with any other sound source).

- A single instrument track can be directly exported as Audio Mixdown.

Mixing down to an audio file

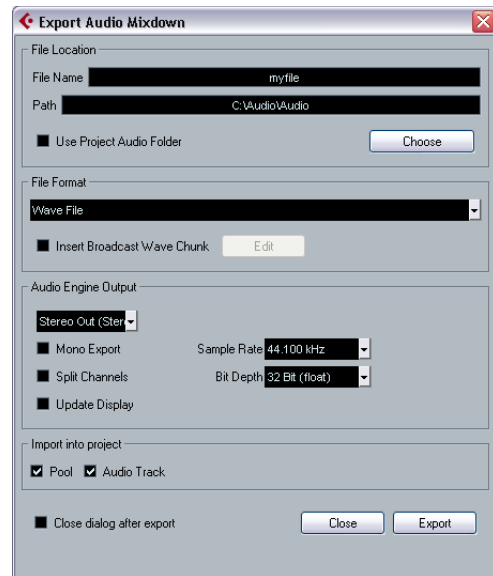
1. Set up the left and right locator to encompass the area that you want to mix down.

2. Set up your tracks so that they play back the way you want.

This includes muting unwanted tracks or parts, making manual mixer settings and/or activating the R (Read) automation buttons for some or all mixer channels.

3. Pull down the File menu and select “Audio Mixdown...” from the Export submenu.

The Export Audio Mixdown dialog appears.



The available settings and options differ depending on the selected file format (see [“The available file formats”](#) on [page 213](#)).

4. Enter a name for the mixdown file in the File name field and specify a path where you want the mixdown to be saved. Alternatively, you can activate the option “Use Project Audio Folder”.

This saves the mixdown file in the Project Audio folder.

5. Select the bus you want to mix down with the Outputs pop-up menu.

This lists all output busses in the active project.

6. Activate the Split Channels option, if you want to export all channels as mono files.

7. Select a file format with the File Format pop-up menu.

8. Make additional settings for the file to be created.

This includes selecting sample rate, bit depth, etc. The available options depend on the selected file format – see [“The available file formats”](#) on [page 213](#).

9. If you want to automatically import the resulting audio file back into Cubase AI, activate the checkboxes in the “Import to” section.

If you activate the “Pool” checkbox, a clip referring to the file will appear in the Pool. Activating the “Audio Track” checkbox as well will create an audio event that plays the clip, and place it on a new audio track, starting at the left locator.

⇒ The Import options are only available if you have selected an uncompressed file format.

10. If you activate Update Display, the meters will be updated during the export process.

This allows you to check for clipping, for example.

11. Click Export.

A dialog with a progress bar is displayed while the audio file is created. If you change your mind during the file creation, you can click the Abort button to abort the operation.

- If the option “Close dialog after export” is activated, the dialog will be closed, otherwise it will be left open.

- If you have activated any of the “Import to” options, the file will be imported back into the project.
When playing back the re-imported file in Cubase AI, remember to mute the original tracks so that you really hear the correct file.

About the Import options dialog

When you activate any of the options in the Import section, the Import Options dialog will open. For a detailed description of the options in this dialog see “Import Medium...” on page 136.

The available file formats

The following pages describe the different export file formats, and their options and settings.

- AIFF files (see “AIFF files” on page 213).
- AIFC files (see “AIFC files” on page 214).
- Wave files (see “Wave files” on page 214).
- Windows Media Audio files (Windows only, see “Windows Media Audio files (Windows only)” on page 214).

MP3 export is available upon upgrade of Cubase AI.
Please contact your vendor for details.

AIFF files

AIFF stands for Audio Interchange File Format, a standard defined by Apple Computer Inc. AIFF files have the extension “.aif” and are used on most computer platforms.

For AIFF files the following options are available:

Option	Description
File name (File Location section)	In this field you can enter a name for the mixdown file.

Option	Description
Path (File Location section)	Here you can specify a path where you want the mixdown to be saved.
Use Project Audio Folder (File Location section)	If you activate this option the mixdown file is saved in the Project Audio folder, as opposed to the specified path.
File Format pop-up menu (File Format section)	From this pop-up menu you can select the file format for the export.
Insert Broadcast Wave Chunk (File Format section)	This allows you to include information about the date and time of creation, a timecode position (allowing you to insert exported audio at the correct position in other projects, etc.) along with author, description and reference text strings in the exported file. Some applications may not be able to handle files with embedded info – if you get problems using the file in another application, turn off the option and re-export.
Edit button (File Format section)	By clicking this button the “Broadcast Wave Chunk” dialog opens where you can enter additional information that will be embedded in the exported files.
Outputs pop-up menu (Audio Engine Output section)	This menu lists all output busses in the active project. Simply select the bus you want to mix down.
Mono Export (Audio Engine Output section)	If you activate this option, the exported audio is mixed down to mono.
Split Channels (Audio Engine Output section)	Activate this option, if you want to export all channels as mono files.
Update Display (Audio Engine Output section)	If you activate this option, the meters will be updated during the export process. This allows you to check for clipping, for example.
Sample Rate (Audio Engine Output section)	This setting determines the frequency range of the exported audio – the lower the sample rate, the lower the highest audible frequency in the audio. In most cases, you should select the sample rate set for the project, since a lower sample rate will degrade the audio quality (mainly reducing the high frequency content) and a higher sample rate will only increase the file size, without adding to audio quality. Also consider the future usage of the file – if you e.g. plan to import the file into another application, you should select a sample rate supported by that application. If you are making a mixdown for CD burning, you should select 44.100 kHz, since this is the sample rate used on audio CDs.

Option	Description
Bit Depth (Audio Engine Output section)	Allows you to select 8, 16, 24 bit or 32 bit (float) files. If the file is an "intermediate mixdown" that you plan to re-import and continue working on in Cubase AI, we recommend that you select the 32 bit (float) option. 32 bit (float) is a very high resolution (the same resolution as used internally for audio processing in Cubase AI), and the audio files will be twice the size of 16 bit files. If you are making a mixdown for CD burning, you should use the 16 bit option, as CD audio is always 16 bit. 8 bit resolution should only be used if required, since it will result in limited audio quality. 8 bit audio may be suitable in some multimedia applications, etc.
Pool (Import section)	Activate this option if you want to import the resulting audio file automatically back into the Pool. A clip referring to the file will appear in the Pool. If this option is activated, the Import Options dialog appears on export. For a description of the available settings, see "Import Medium..." on page 136 .
Audio Track (Import section)	If you activate this option, an audio event that plays the clip will be created and placed on a new audio track, starting at the left locator. If this option is activated, the Import Options dialog appears on export. For a description of the available settings, see "Import Medium..." on page 136 .
Close dialog after export	If this option is activated, the dialog will be closed after the export, otherwise it will be left open.

AIFC files

AIFC stands for Audio Interchange File Format Compressed, a standard defined by Apple Computer Inc. These files support compression ratios as high as 6:1 and contain tags in the header. AIFC files have the extension ".aifc" and are used on most computer platforms.

AIFC files support the same options as AIFF files.

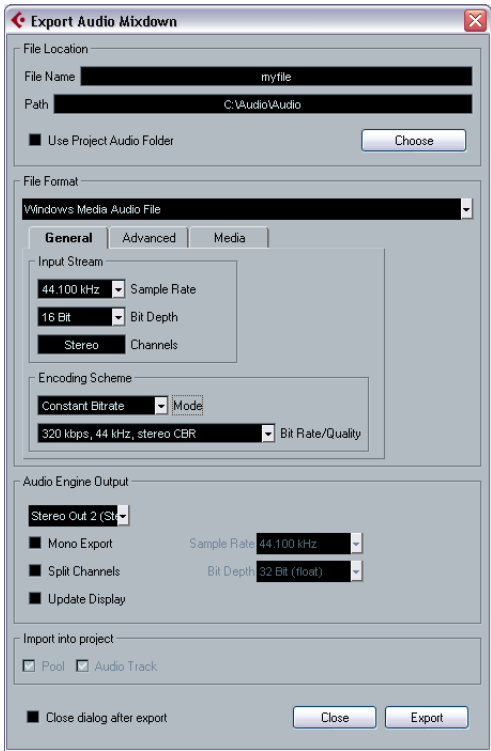
Wave files

Wave files have the extension ".wav" and are the most common file format on the PC platform.

Wave files support the same options as AIFF files.

Windows Media Audio files (Windows only)

This is a format developed by Microsoft Inc. Due to the advanced audio codecs and lossless compression used, WMA files can be decreased in size with no loss of audio quality. The files have the extension ".wma".



Exporting a WMA mixdown

The following options are available:

Input Stream

Here you set the sample rate (44.1, 48 or 96 kHz) and the bit resolution (16 bit or 24 bit) of the encoded file. These should be set to match the sample rate and bit resolution of the source material. If no value matches that of your source material, use the closest highest available value. E.g. if you're using 20 bit source material, set the bit resolution to 24 bit rather than 16 bit.

Encoding Scheme

These settings are used for defining the desired output from the encoder. Make settings appropriate for the intended use of the file. If the file will be downloaded or streamed on the Internet, you might not want too high bit rates for example.

- **Mode**

The WMA encoder can use either an encoding with constant or variable bit rate or a lossless encoding. The options on this menu are as follows:

Mode	Description
Constant Bitrate (CBR)	This will encode to a file with a constant bit rate (set in the Bit Rate/Channels menu, see below). Constant bit rate is preferably used if you want to limit the size of the final file. The size of a file encoded with constant bit rate is always the bit rate times the duration of the file.
Variable Bitrate with Quality	Encodes to a file with a variable bit rate, according to a quality scale (the desired quality is set in the Bit Rate/Channels menu, see below). When you encode with variable bit rates, the bit rate fluctuates depending on the character and intricacy of the material being encoded.s The more complex passages in the source material, the higher the bit rate – and the larger the final file – will be.
Lossless	Encodes to a file with lossless compression.

- **Bit Rate/Channels**

This menu allows you to set the desired bit rate – from 128 kbps to 768 kbps, depending on the selected Mode (see above). If the Mode “Variable Bitrate with Quality” is used (see above), the menu allows you to select from six levels of desired quality, with 10 being the lowest and 100 the highest. Generally, the higher the bitrate or quality you select, the larger the final file will be.

Dynamic Range Control

These controls allow you to define the dynamic range of the encoded file. The dynamic range is the difference in dB between the average loudness and the peak audio level (the loudest sounds) of the audio. These settings affect how the audio is reproduced if the file is played on a Windows XP computer with a player in the Windows Media 9 series, and the user activates the special “Quiet Mode” feature of the player to control the dynamic range.

The dynamic range is automatically calculated during the encoding process, but you can specify it manually as well.

If you want to manually specify the dynamic range, first put a checkmark in the box to the left by clicking in it and then enter the desired dB values in the Peak and Average fields. You can enter any value between 0 and -90dB.

Note however that it is usually not recommended to change the Average value, since it affects the overall volume level of the audio and therefore can affect the audio quality adversely.

The Quiet Mode in a Windows Media 9 player can be set to one of three settings. Below, these settings are listed together with an explanation of how the Dynamic Range settings affect them:

- **Off:** If Quiet Mode is off, the dynamic range settings that were automatically calculated during the encoding will be used.
- **Little Difference:** If this is selected and you have not manually changed the dynamic range settings, the peak level will be limited to 6dB above the average level during playback. If you have manually specified the dynamic range, the peak level will be limited to the mean value between the peak and average values you specified.
- **Medium Difference:** If this is selected and you have not manually changed the dynamic range settings, the peak level will be limited to 12dB above the average level. If you have changed the dynamic range, the peak level will be limited to the peak value you specified.

Output Media Description

In these fields you can enter a number of text strings with information about the file – title, author, copyright information and a description of its contents. This information will then be embedded in the file header and can be displayed by some Windows Media Audio playback applications.

Background

What is synchronization?

Synchronization is said to exist when you make two pieces of equipment agree on time or tempo and position info. You can establish synchronization between Cubase AI and a number of other types of devices, including tape recorders and video decks, but also MIDI devices that “play back”, such as other sequencers, drum machines, “workstation sequencers” etc.

When you set up a synchronization system, you must decide which unit is the master. All other devices are then slaved to this unit, which means they will adjust their playback speed to the master’s.

Cubase AI as a slave

When a synchronization signal is coming in to Cubase AI, from another device (such as a tape recorder, video recorder, etc.), this device is the master and Cubase AI is the slave. Cubase AI will adjust its playback to the other device.

Cubase AI as a master

When you set up Cubase AI to transmit synchronization information to other devices, Cubase AI is the master and the other devices are the slaves; they will adjust their playback to Cubase AI.

Cubase AI – both master and slave

Cubase AI is a very capable synchronization device. It can operate as both a master and a slave at the same time. For example, Cubase AI might be slaved to a tape recorder transmitting timecode, while at the same time transmitting MIDI Clock to a drum machine, acting as a master for that.

⚠ For a description of the VST System Link feature (with which you can synchronize separate computers running Cubase AI or Nuendo for example), see “[VST System Link](#)” on [page 223](#).

Synchronization signals

Basically there are three types of synchronization signals for audio: timecode, MIDI clock and word clock.

Timecode (SMPTE, EBU, MTC, VITC etc.)

Timecode appears in a number of guises. No matter which “format” it has, it always supplies a “clock on the wall” type of synchronization, that is, a synchronization related to hours, minutes, seconds and two smaller units called “frames” and “subframes”.

- LTC (SMPTE, EBU) is the audio version of timecode. This means that it can be recorded on the audio track of an audio or video recorder.
- VITC is the video format timecode, i.e. it is stored in the actual video image.
- MTC is the MIDI version of timecode, transmitted via MIDI cables.
- ADAT sync (Alesis) is only used with the ASIO Positioning Protocol, see “[About the ASIO Positioning Protocol \(APP\)](#)” on [page 222](#).

For the ASIO Positioning Protocol other high precision timecode formats may also be supported.

Format recommendations for timecode – without ASIO Positioning Protocol

- When synchronizing your system to external timecode, via a synchronizer, the most common timecode format is MTC. Contrary to some reports you might have heard, MTC delivers good precision for external sync. This is due to the fact that the operating system can “time stamp” incoming MIDI messages, which increases precision.

Format recommendations for timecode – with ASIO Positioning Protocol

- LTC and VITC are the formats with the highest precision and are recommended when available.
- MTC is the next best option and probably the most common choice, since few audio hardware solutions have built-in LTC or VITC readers. However, LTC and VITC offer even higher precision when available.

MIDI Clock

MIDI Clock is a tempo-based type of synchronization signals, i.e. it is related to the number of “beats per minute”. MIDI Clock signals are suitable for synchronizing two devices that agree on tempo, such as for example Cubase AI and a drum machine.

⚠ MIDI Clock is not suitable as a master sync source for an application like Cubase AI. Therefore Cubase AI will transmit MIDI Clock signals to other devices, but it will not receive MIDI Clock.

Word Clock

Word clock is basically a replacement for the sample rate clock in for example an audio card. Word clock hence runs at the same rate as the sample rate in the audio, 44.1kHz, 48kHz etc.

Word clock does not contain any position information, it is only a “simple” signal for clocking the audio at its sample rate.

Word clock comes in many formats, analog on coaxial cable, digital as part of an S/PDIF, AES/EBU or ADAT audio signal, etc.

Synchronizing the transport vs. synchronizing audio

How timing is handled in a non-synchronized system

Let’s first look at the situation where Cubase AI is not synchronized to any external source:

Any digital playback system has an internal clock that ultimately affects the playback speed and stability, and PC audio hardware is no exception. This clock is extremely stable.

When Cubase AI is playing back with no external synchronization, all playback is internally synchronized to the internal digital audio clock.

Synchronizing Cubase AI’s playback

Let’s assume now that we use external timecode synchronization with Cubase AI. For example, we might synchronize playback to a tape recorder.

Timecode coming from an analog tape recorder will always vary slightly in speed. Different timecode generators and different tape recorders will also supply timecode with slight differences in speed. In addition, the shuttling of tape mechanisms due to overdubs and re-recordings can cause the physical tape to wear and stretch, which affects the speed of the timecode.

If you use a synchronizer that generates wordclock and set up Cubase AI to sync to incoming timecode, it will vary its overall playback speed to compensate for such fluctuations in the speed of the timecode – that’s the whole purpose of synchronization.

What happens with the digital audio?

The fact that Cubase AI’s playback is synchronized to the timecode does not affect the playback of the digital audio. It still relies on the perfectly stable, built-in clock in the audio hardware.

As might be expected, problems will appear when the perfectly stable digital audio gets related to the slightly varying speed of a system synchronized to timecode.

The playback timing of each event will not be in total accordance with the tape or the MIDI playback, since the playback speed of the audio is determined by the digital audio hardware’s built-in clock.

Resolving to word clock

The solution to this problem is to use one external clock for all components in the system. One master clock is used to derive whatever type of clock signal each component in the system needs. For example, something called a house clock can be used to generate sample rate clocks for the digital audio hardware and timecode for Cubase AI. This ensures that all components in the system use the same reference source for their timing.

Synchronizing digital audio to external clocks running at sample rate is often called “resolving” or “synchronizing to word clock”.

If you aim to perform synchronization to external signals, we strongly recommend that you obtain proper synchronization equipment. This encompasses:

- An audio card that can be slaved to external word clock.
- A synchronizer that can read timecode (and possibly house clock) and generate the required sync signals from that, such as the Steinberg TimeLock Pro.

or...

- An audio system with complete built-in synchronization possibilities, preferably supporting the ASIO Positioning Protocol (see [“About the ASIO Positioning Protocol \(APP\)”](#) on [page 222](#)).

Using timecode without word clock

Of course, it is possible to set up a synchronization system where you lock Cubase AI to timecode without using word clock. However, please note that the timing of audio vs. MIDI cannot be guaranteed and that fluctuations in speed in the incoming timecode will not affect the playback of audio events. This means that synchronizing to timecode may work in the following situations:

- When the timecode was originally generated by the audio card itself.
- When the source providing the timecode is extremely stable (such as a digital video system, a digital tape recorder or another computer).
- When you remain synchronized to that same stable source throughout the entire process, both while recording and playing back audio.

Making basic settings and connections

Setting the Frame Rate

The frame rate is the number of frames per second in a film or on a video tape. Just as there is always sixty seconds to a minute, there is always a certain number of frames to each second. However, the frame rate used varies with the type of media (film or video), which country the video tape has been produced in, and other circumstances.

In the Project Setup dialog are two settings for frame rates:

- The Frame Rate pop-up is automatically adjusted to the frame rate of the incoming timecode.

There is an exception to this when you are synchronizing Cubase AI to MIDI Timecode: If you have selected 29.97 fps or 30 dfps as Frame Rate in Cubase AI, this selection will be kept, since these frame rates can not be distinguished in the MTC format.

The Project Setup dialog contains six frame rates to choose from:

Frame Rate	Description
24 fps	The traditional frame rate of 35mm film.
25 fps	The frame rate used for all video and audio in Europe (EBU).
29.97 fps	Straight 29.97 frames per second.
29.97 dfps	“Drop frame” code running at 29.97 frames per second, most often used in the United States of America for work with color video.
30 fps	Straight 30 frames per second. This is often used in the United States for audio only work.
30 dfps	Very rarely used.

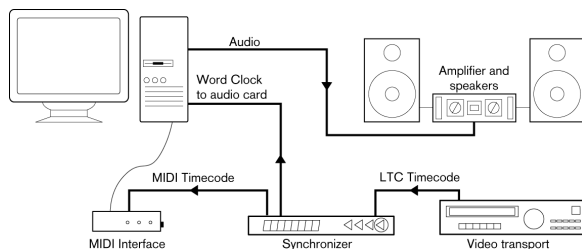
- The Display Format pop-up contains a number of formats that when selected work as the “master” setting for the display format used in the various windows’ rulers and position displays.

Making connections

The following connections are required for external sync via a synchronizer, including resolving of the audio card. For details on audio card and synchronizer settings and connections, see the manuals for these devices.

- Route the master clock signal (LTC, VITC, etc.) to an input on the synchronizer.
- Connect the word clock output on the synchronizer to a word clock input on the audio card.
- Connect the MIDI Timecode (MTC) output on the synchronizer to the corresponding input on the computer.

- Set up the synchronizer and make sure the frame rate settings are in accordance with the master clock.



A typical synchronization setup.

Synchronization settings

In the following sections you will find a description of how to set up your system for the different timecode sources:

Internal Timecode

In this mode, Cubase AI is the master.

Use the “MIDI Timecode Destinations” and “MIDI Clock Destinations” sections to specify which devices should be slaved to Cubase AI.

Synchronizing other Equipment to Cubase AI

You may have other MIDI devices that you want to synchronize to Cubase AI. There are two types of synchronization signals that Cubase AI can transmit: MIDI Clock and MIDI Timecode.

Transmitting MIDI Clock

If you transmit MIDI Clock to a device supporting this type of synchronization signal, the other device will follow Cubase AI's tempo. The tempo setting in the other device is of no relevance. If the device also reacts to Song Position Pointers (which Cubase AI transmits), it will follow when you wind, rewind and locate using the Cubase AI Transport panel.

⇒ MIDI Clock transport commands include “Start”, “Stop” and “Continue”. However, some MIDI equipment (e.g. some drum machines) do not recognize the “Continue” command. If this is the case with your equipment, activate the option “Always Send Start Message” in the Synchronization Setup dialog (MIDI Clock Destinations section). When this is activated, only the Start command is used.

- Activate “MIDI Clock Follows Project Position” if you want the other device to follow when you loop, jump and locate during playback.

When this is activated, the sent MIDI Clock signals will follow the sequencer time and tempo position at all times.

⚠ Please note that some external devices may not react smoothly to these repositioning messages. Especially when working with some older devices, it may take some time for them to synchronize accurately to the project time.

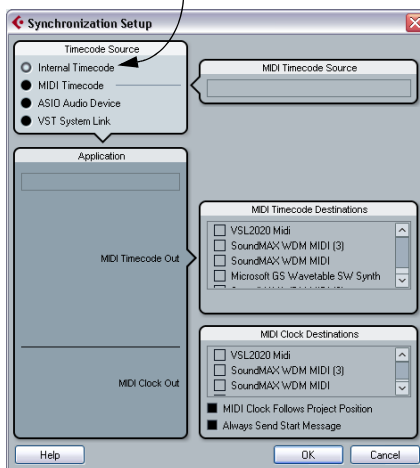
Transmitting MIDI Timecode

If you transmit MIDI Timecode to a device supporting this type of synchronization signal, the device will synchronize time-wise to Cubase AI, that is, the time display on Cubase AI's Transport panel and on the other device will agree. When you wind and locate Cubase AI and then activate playback, the other device will follow from the same position (if it has this capability and is set up for it!).

Setting Up

1. Connect the desired MIDI Outputs from Cubase AI to the device(s) that you plan to synchronize.
2. Open the Synchronization Setup dialog from the Transport menu.

Settings for sync to internal timecode.



3. Specify the sync destinations by using the checkboxes in the corresponding sections in the lower right part of the dialog.

You can output any combination of MIDI Timecode and MIDI Clock to any combination of outputs (however, you probably don't want to send MTC and MIDI Clock to the same output).

⚠ Some MIDI interfaces will automatically send MIDI Clock to all MIDI outputs, regardless of the MIDI Clock port selection you make in Cubase AI. If this is the case, you should only select one MIDI Clock port (consult the documentation of the MIDI interface if in doubt).

4. Set the other device(s) to their “external synchronization” mode (or some other mode with a similar name) and activate playback on them if necessary.
5. Activate playback in Cubase AI, and the other device(s) will follow.

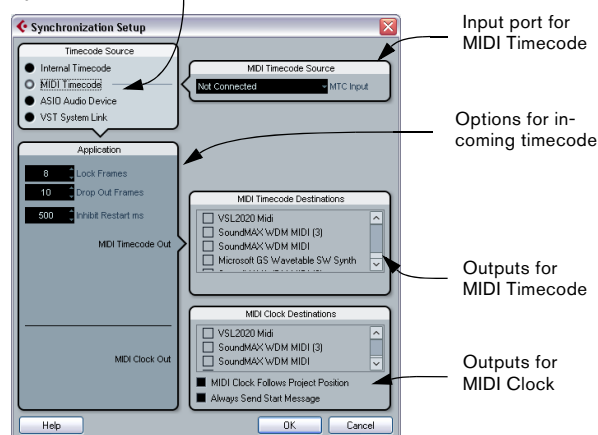
MIDI Timecode

In this mode, Cubase AI is the slave and the timecode is sent by the MIDI Timecode Source specified in the corresponding section.

Setting up Cubase AI for external sync to timecode

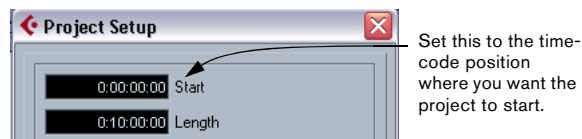
1. In the Synchronization dialog, set Timecode Source to MIDI Timecode.
2. Use the pop-up menu in the MIDI Timecode Source section to select an input for the timecode.

Sync to timecode activated



3. Close the Synchronization Setup dialog and open the Project Setup dialog from the Project menu.

4. Use the Start value to set which frame on the external device (e.g. a video tape) should correspond to the beginning of the project.



5. In the dialog that appears, you are asked if you want to keep the project content at its timecode positions. Select “No”.

This will make all events and parts keep their positions relative to the project start.

6. Close the Project Setup dialog.

7. On the Transport panel, activate the Sync button (or select Sync Online from the Transport menu).

8. Start the tape (or video, or other master device) that contains the timecode. Cubase AI starts playing when it receives timecode with a position “higher” than, or equal to, the project Start frame.

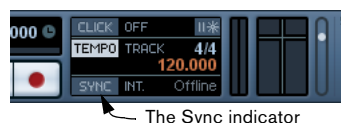
You can wind the device that sends the timecode to any position and start from there.

⚠ When the master device with the timecode is stopped, you can use the Cubase AI transport controls as you normally do, when it is not synchronized.

You should also take a look at the options in the Application section, see [“Application options”](#) on [page 223](#).

The Sync indicator

On the Transport panel you can check the status of incoming timecode by observing the sync indicator. It switches between “Offline” (not waiting for sync), “Idle” (ready for sync but no signal is coming in), and “Lock xx” (where xx indicates the frame rate of the incoming signal).



ASIO Audio Device

⚠ This option is only available if your hardware is compatible with the ASIO Positioning Protocol.

In this mode, Cubase AI is the slave and the synchronization signal can be received from another device connected to a digital interface of the audio hardware.

About the ASIO Positioning Protocol (APP)

⚠ The ASIO Positioning Protocol requires audio hardware with specific ASIO drivers.

The ASIO Positioning Protocol is a technology that expands on the type of sync described above and makes sample-accurate positioning possible.

When transferring audio digitally between devices, it is important that synchronization using word clock and timecode is completely correlated. If not, the audio will not be recorded at the exact intended (sample-accurate) position, which can cause various types of problems, such as inaccurately positioned audio material, clicks and pops etc.

A typical situation is when transferring material from a digital multi-track tape recorder to Cubase AI (for editing) and then back again. If you do not have sample-accurate synchronization set up, you cannot be sure that the material will appear in its exact original position, when transferred back to the tape recorder.

In order to take advantage of the ASIO Positioning Protocol, your audio hardware must be suitably equipped and the functionality must be included in the ASIO driver for the hardware.

An example of a system for sample-accurate transfers would be transferring audio tracks from an Alesis ADAT to Cubase AI. Here the ADAT will be the sync master (though it doesn't necessarily have to be). It provides both the digital audio (with an inherent word clock) and position information (timecode) via its ADAT sync protocol. The master clock is generated by the ADAT itself.

Hardware and software requirements for APP

- Your computer audio hardware (in the example above this would be an ADAT card in your computer) must support all the functionality required for the ASIO Positioning Protocol. That is, it must be able to read the digital audio and the corresponding position information from the external device.
- There must be an ASIO 2.0 driver for the audio hardware.
- For resolving to external timecode, the audio hardware must have an integrated timecode reader/generator on-board.
- For information about which audio hardware models currently support APP, see the Steinberg web site (www.steinberg.net).

⚠ The ASIO Positioning Protocol exploits the specific advantage of having an audio card that has an integrated timecode reader. With such a card and the ASIO Positioning Protocol, you can achieve constant sample-accurate synchronization between the audio source and Cubase AI.

Setting up the audio card for external synchronization

1. Open the Device Setup dialog from the Devices menu and, on the VST Audio System page, select your audio interface from the "ASIO Driver" pop-up menu.

In the Devices List, the name of the audio interface is displayed below the VST Audio System entry.

2. Select your audio interface in the Devices list to the left.

3. Click the Control Panel button to open the card's proprietary setup dialog.

If this card is accessed via a special ASIO driver, this dialog is provided by the card, not by Cubase AI. Hence the settings vary with the card brand and model.

4. Adjust the settings as recommended by the card manufacturer, then close the dialog.

The dialog may also contain various diagnostic tools that allow you to verify for example whether word clock is arriving correctly.

5. From the Clock Source pop-up, select the input to which you routed the word clock signal.

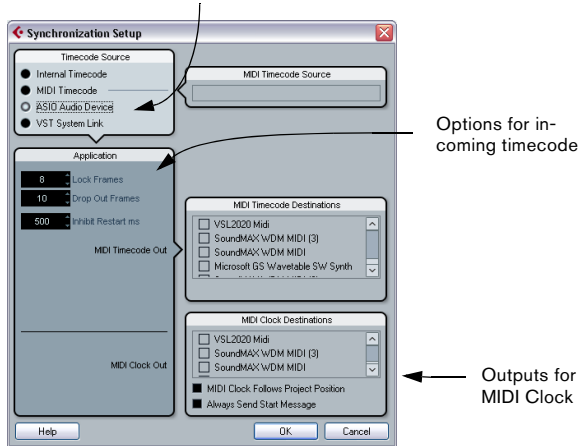
This pop-up may not be used if you selected an input in the Control Panel dialog instead.

6. Click OK to close the Device Setup dialog.

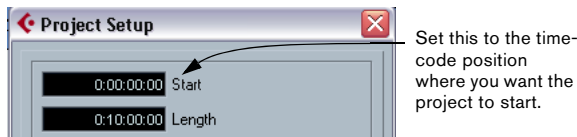
You can now set up the synchronization:

1. Open the Synchronization Setup dialog and set the Timecode Source to ASIO Audio Device.

The ASIO Audio Device is selected as Timecode Source



2. Make the desired settings in the dialog.
For information on the different sections, click the Help button in the dialog.
3. Close the Synchronization Setup dialog.
4. Open the Project Setup dialog from the Project menu and use the Start value to set which frame on the external device (e.g. a video tape) should correspond to the beginning of the project.



5. A message appears, asking you whether you want to keep the project content at its timecode positions. Select "No".
This will make all events and parts keep their positions relative to the project start.
6. Close the Project Setup dialog.
7. On the Transport panel, activate the Sync button (or select Sync Online from the Transport menu).

8. Start the tape (or video, or other master device) that contains the timecode. Cubase AI starts playing when it receives timecode with a position "higher" than, or equal to, the project Start frame.

You can wind the device that sends the timecode to any position and start from there.

⚠ When the master device with the timecode is stopped, you can use the Cubase AI transport controls as you normally do, when it is not synchronized.

You should also take a look at the options in the Application section, see ["Application options"](#) on [page 223](#).

The Sync indicator

On the Transport panel you can check the status of incoming timecode by observing the sync indicator. It switches between "Offline" (not waiting for sync), "Idle" (ready for sync but no signal is coming in), and "Lock xx" (where xx indicates the frame rate of the incoming signal).

VST System Link

⚠ For a description of the VST System Link feature (with which you can synchronize separate computers running Cubase AI or Nuendo for example) see ["VST System Link"](#) on [page 223](#).

Application options

The following options are available in the Application section of the Synchronization Setup dialog:

Lock Frames

Using this field you can set how many frames of "correct" timecode Cubase AI should receive before attempting to "lock" (synchronize) to incoming timecode. If you have an external tape transport with a very short start-up time, you could try lowering this number to make lock-up even faster than it already is.

Drop Out Frames

On an analog tape with timecode, dropouts may occur. If a drop-out is very long, Cubase AI may (temporarily) stop. In the Dropout Frames field you can set how long a dropout (in frames) should be tolerated until Cubase AI de-

cides that the tape isn't good enough to synchronize to. If you have a very stable timecode source, you may lower this number to make Cubase AI stop more swiftly after the tape recorder has been stopped.

Inhibit Restart

Some synchronizers will still transmit MIDI Time Code for a short period after an external tape machine has been stopped. These extra frames of timecode can sometimes cause Cubase AI to restart suddenly. Inhibit Restart allows you to control the amount of time in milliseconds that Cubase AI will wait to restart (ignoring incoming MTC) once it has stopped.

Working with VST System Link

VST System Link is a network system for digital audio that allows you to have several computers working together in one large system. Unlike conventional networks it does not require Ethernet cards, hubs, or CAT-5 cables; instead it uses the kind of digital audio hardware and cables you probably already possess in your studio.

VST System Link has been designed to be simple to set up and operate, yet give enormous flexibility and performance gains in use. It is capable of linking computers in a “ring” network (the System Link signal is passed from one machine to the next, and eventually returns to the first machine). VST System Link can send its networking signal over any type of digital audio cable, including S/PDIF, ADAT, TDIF, or AES, as long as each computer in the system is equipped with a suitable ASIO compatible audio interface.

Linking up two or more computers gives you vast possibilities:

- Dedicate one computer to running VST instruments while recording audio tracks on another.
- If you need lots of audio tracks, you may simply add tracks on another computer.
- You could have one computer serve as a “virtual effect rack”, running CPU-intensive send effect plug-ins only.

Since you can use VST System Link to connect different VST System Link applications on different platforms, you can take advantage of effect plug-ins and VST instruments that are specific to certain programs or platforms.

Preparations

Requirements

The following equipment is required for VST System Link operation:

- Two or more computers.
These can be of the same type or use different operating systems – it doesn't matter. For example, you can link an Intel-based PC to an Apple Macintosh without problems.

- Each computer must have audio hardware with specific ASIO drivers, installed and working.

- The audio hardware must have digital inputs and outputs.

Of course, to be able to connect the computers, the digital connections must be compatible (i.e. the same digital formats and connection types must be available).

- At least one digital audio cable for each computer in the network.

- A VST System Link host application installed on each computer.

Any VST System Link applications can connect to each other.

Additionally, we recommend that you use a KVM switch-box:

Using a KVM switchbox

If you want to set up a multi-computer network, or even a small network in a limited space, it's a good idea to invest in a KVM (Keyboard, Video, Mouse) switchbox. With one of these switchers you can use the same keyboard, monitor, and mouse to control each computer in the system, and switch between computers very rapidly. KVM switchers are not too expensive, and very easy to setup and operate. If you decide not to go this route, the network will function just the same, but you may end up doing a lot of jumping from one machine to the other while setting up!

Making connections

Below, we assume that you are connecting two computers. Should you have more than two computers, it's still best to start with two and add the others one by one once the system is working – this makes troubleshooting easier if you run into problems. For two computers, you will need two digital audio cables, one in each direction:

1. Connect a digital audio cable from the digital output of computer 1 to the digital input of computer 2.
2. Connect the other cable from the digital output of computer 2 into the digital input of computer 1.
 - If a card has more than one set of inputs and outputs, choose whichever one that suits you – for simplicity usually the first set is best.

Synchronization

Before you proceed, you need to make sure that the clock signals on your ASIO cards are synchronized correctly. This is essential when cabling any kind of digital audio system, not just VST System Link.

⚠ All digital audio cables by definition always carry a clock signal as well as audio signals, so you don't have to use a special Word Clock input and output for this (although you may find that you get a slightly more stable audio system if you do, especially when using multiple computers).

The Clock Mode or Sync Mode is set up in the ASIO control panel of the audio hardware. In Cubase AI, you proceed as follows:

1. Pull down the Devices menu and open the Device Setup dialog.
2. On the VST Audio System subpage, select your audio interface from the "ASIO Driver" pop-up menu.
In the Devices List, the name of the audio interface is displayed below the VST Audio System entry.
3. Select your audio interface in the Devices list to the left.
4. Click the Control Panel button.
The ASIO control panel appears.

5. Open the ASIO control panel on the other computer as well.

If you are using another VST System Link host application on that computer, check its documentation for details on how to open the ASIO control panel.

6. Now, you need to make sure that one audio card (and only one!) is set to be the Clock Master, and all the other cards are set to listen for the clock signal coming from the Clock Master i.e. they must be Clock Slaves.

The naming and procedure for this differs depending on the audio hardware – consult its documentation if required. If you are using Steinberg Nuendo ASIO hardware, all cards default to the "AutoSync" setting – in this case you must set one of the cards (and only one) to "Master" in the Clock Mode section of the control panel.

- Typically, the ASIO control panel for an audio card contains some indication of whether the card receives a proper sync signal or not, and the sample rate of that signal.

This is a good indication that you have connected the cards and set up clock sync properly. Check your audio hardware's documentation for details.

⚠ It's very important that one and only one card is the clock master, otherwise the network cannot function correctly. Once you have set this up, all the other cards in the network will take their clock signal from this card automatically.

The only exception to this procedure is if you are using an external clock – which could be from a digital mixing desk or special Word Clock synchronizer for example. If so, you must leave all your ASIO cards in Clock Slave or AutoSync mode, and make sure that each of them is listening for the signal coming from the synchronizer, usually passed through your ADAT cables or Word Clock connectors in a daisy chain fashion.

VST System Link and latency

The general definition of latency is the amount of time it takes any system to respond to whatever messages are sent to it. For example, if your system's latency is high and you play VST instruments in real time, you will get a noticeable delay between when you press a key and when you hear the sound of the VST instrument. Nowadays, most ASIO-compatible audio cards are capable of operating with very low latencies. Also, all VST applications are designed to compensate for latency during playback, making the playback timing tight.

However, the latency time of a VST System Link network is the total latency of all the ASIO cards in the system added together. Therefore it's extra important to minimize the latency times for each computer in the network.

⇒ The latency does *not* affect the synchronization – it's always perfectly in time. But, it can affect the time it takes to send and receive MIDI and audio signals, or make the system seem sluggish.

To adjust the latency of a system, you adjust the size of the buffers in the ASIO control panel – the lower the buffer size, the lower the latency. It's best to keep to fairly low latencies (buffer sizes) if your system can handle it – about 12 ms or less is usually a good idea.

Setting up your software

Now it's time to set up your programs. The procedures below describe how to set things up in Cubase AI; if you are using another program on the other computer, please refer to its documentation.

Setting the sample rate

The projects in both programs must be set to use the same sample rate. Select “Project Setup...” from the Project menu and make sure the sample rate is the same in both systems.

Streaming digital audio between applications

1. Create input and output busses in both applications and route these to the digital inputs and outputs.

The number and configuration of the busses depends on your audio hardware and on your needs. If you have a system with eight digital i/o channels (such as an ADAT connection), you could create several stereo or mono busses together with a stereo bus, or any combination you need. The important thing is that you should have the same configuration in both applications – if you have four stereo output busses on computer 1, you want four stereo input busses on computer 2, etc.

2. Set things up so that computer 1 plays back some audio.

You can for example import an audio file and play this back in Cycle mode.

3. In the Inspector or mixer, make sure the playing audio channel is routed to one of the digital output busses you set up.

4. In computer 2, open the mixer and locate the corresponding digital input bus.

The audio being played back should now “appear” in the program running on computer 2. You should see the input bus level meters moving.

5. Reverse this procedure so that computer 2 plays back and computer 1 “listens”.

Now you have verified that the digital connection works as it should.

⇒ From this point on in this chapter, we refer to the busses connected to the digital inputs and outputs as “VST System Link busses”.

Settings for the audio hardware

When you send VST System Link data between computers, it is important that the digital information isn't changed in any way between the programs. Therefore, you should open the control panel (or additional application) for your audio hardware and make sure that the following conditions are met:

- If there are additional “format settings” for the digital ports that you use for VST System Link data, make sure these are turned off.

For example, if you are using an S/PDIF connection for VST System Link, make sure that “Professional format”, Emphasis and Dithering are turned off.

- If your audio hardware has a mixer application allowing you to adjust the levels of digital inputs and outputs, make sure that this mixer is disabled or that the levels for the VST System Link channels are set to $\pm 0\text{dB}$.
- Similarly, make sure no other forms of DSP (pan, effects, etc.) are applied to the VST System Link signal.

Notes for Hammerfall DSP users

If you are using RME Audio Hammerfall DSP audio hardware, the Totalmix function allows for extremely complex signal routing and mixing in the audio hardware. This can in some situations lead to “signal loops” in which case the VST System Link won't work. If you want to make absolutely sure this won't cause any problems, select the default or “plain” preset for the Totalmix function.

Activating VST System Link

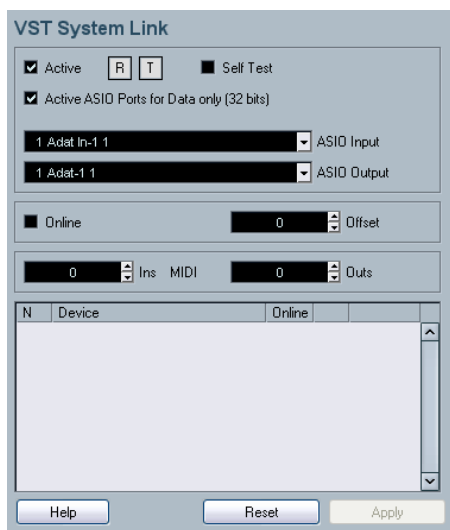
Before you proceed you need to make sure that VST System Link is set as Timecode Source in the Synchronization dialog and that the desired Sync options are activated, see “[Application options](#)” on [page 223](#).

After setting up the inputs and outputs, you now need to define which input/output should carry the actual VST System Link information.

The System Link networking signal is carried on only one bit of one channel. This means that if you have an ADAT based system which normally carries eight channels of 24-bit audio, once you activate VST System Link you will have seven channels of 24-bit audio and one channel of 23-bit audio (the least significant bit of this last channel will be used for networking). In practice this makes no discernible difference to the audio quality, since you will still have around 138dB headroom on this channel.

To set things up, open the VST System Link panel:

1. Open the Device Setup dialog on the Devices menu.
2. Select VST System Link in the Devices List to the left.



3. Use the ASIO Input and ASIO Output pop-up menus to define which channel should be the networking channel (and thus become a 23-bit audio channel, in our example). Quite often you will be able to leave these pop-ups the way they are.

4. Click the Active checkbox at the top of the panel.
5. Repeat the steps above for every computer on the network.

As the computers are made active, you should see the small T (Transmit) and R (Receive) lights flashing on each active computer, and the name of each computer should appear in the list at the bottom of the pane. Each computer is assigned a random number – don't worry about this, it's just so the network knows internally which one is which.

- You can double-click on the name in bold (which is the name of the computer you're currently working on) and set it to whatever other name you wish.

This name will appear in the System Link window of every computer on the network.

⇒ If you don't see the name of each computer appearing once you have made it active, you may have to check your settings.

Go through the procedure above again and make sure that all ASIO cards are listening to the digital clock signals correctly, and that each computer has the correct inputs and outputs assigned to the System Link network.

Putting the network online

After each computer's name you will see whether it is online or not. When a computer is online, it will receive transport and timecode signals, and its sequencer application can be started and stopped by remote control. If it is offline, it can only be started from its own keyboard – it is effectively an independent machine, although it is still on the network.

⇒ Note that any computer can control any and all of the others – VST System Link is a peer-to-peer network and there is no absolute “master” computer.

However, most users do like to think of one machine as the master (in a one person/two computer network, this would be the machine you actually sit behind most of the time).

For now, let's put all computers online:

1. Activate the Online checkbox in the VST System Link panel for all computers.

2. Check that the system is working by pressing Play on one computer – all computers should start almost instantly and play perfectly in time, with sample-accurate precision.

- The Offset setting to the right allows you to adjust whether one machine will play back slightly ahead or behind the rest.

This is normally not needed, but occasionally with some hardware you may find that the lock is a few samples out. In that case you can adjust the lock with the Offset value. For now, leave it set to 0 – it will most likely be what you want.

VST System Link sends and understands all transport commands, so you can play, stop, fast forward, rewind etc. the entire network from one computer without a problem – try it! If you jump to a locator point on one machine, all other machines will also instantly jump to that locator point.

⚠ Make sure that all computers have their tempos set to the same value, otherwise your synchronization will be seriously skewed.

Using MIDI

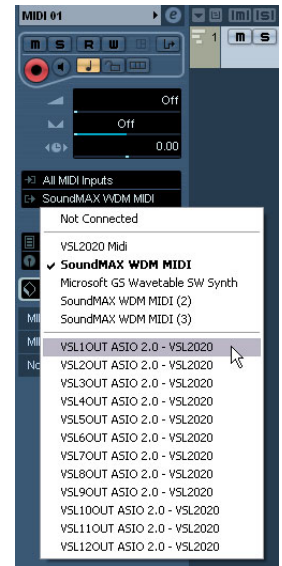
As well as supplying transport and sync control, VST System Link also supplies up to 16 MIDI ports, each with 16 channels. You set this up as follows:

1. Use the MIDI Ins and Outs value boxes to specify the number of MIDI ports you need.

The default value is 0 MIDI In and 0 MIDI Out ports.

2. Create a MIDI track in the Project window and open the Inspector (top section).

3. If you now pull down the Input and Output Routing pop-up menus, you will find the specified System Link ports added to the list of MIDI Inputs and Outputs.



This allows you to route MIDI tracks to VST instruments running on another computer, as described in the application examples (see [“Using one computer for VST instruments”](#) on [page 230](#)).

The “Active ASIO Ports for Data only” setting

If you are sending huge amounts of MIDI data at once, there is a small possibility that you might run out of bandwidth on your VST System Link network. This will manifest itself by notes “choking” or timing becoming erratic.

If this happens, you can devote more bandwidth to MIDI by activating Active ASIO Ports for Data only in the VST System Link Setup panel. When this is activated, the VST System Link information will be sent on the entire channel instead of just one bit, more than enough for all the MIDI you could ever hope to use. The downside is that you can no longer use this ASIO channel for audio transfer (do not connect it to a speaker!), thus leaving you only 7 channels of audio in our ADAT cable example. Depending on how you work this might be a reasonable compromise.

Hearing the network audio

If you are using an external mixing desk, hearing your audio really isn't an issue – just plug the outputs of each computer into the desired channels on the external mixing desk, press Play on one of the computers, and you're good to go.

However, many people prefer to mix internally inside the computer and just use a desk for monitoring (or maybe not use any external mixer at all). In this case you'll need to select one computer to be your “main mix computer” and send the audio from your other computers into this.

In the following example, we assume you are using two computers, with computer 1 as your main mix computer and computer 2 running two additional stereo audio tracks, an FX channel track with a reverb plug-in and a VST instrument plug-in with stereo outputs.

1. First you want to set things up so that you can listen to the audio playback from computer 1.

In other words, you need an unused set of outputs, e.g. an analog stereo output, connected to your monitoring equipment.

2. Go to computer 2 and route each of the two audio tracks to a separate output bus.

These should be busses connected to the digital outputs – let's call them Bus 1 and 2.

3. Route the FX channel track to another VST System Link bus (Bus 3).

4. Route the VST instrument channel to yet another bus (Bus 4).

5. Go back to computer 1 and check the corresponding four VST System Link input busses.

If you start playback on computer 2, the audio should “appear” on the input busses on computer 1. However, to mix these audio sources you need actual mixer channels:

6. Add four new stereo audio tracks on computer 1 and route these to the output bus you use for listening, e.g. to the analog stereo outputs.

7. For each of the audio tracks, select one of the four input busses.

Now, each computer 2 bus is routed to a separate audio channel on computer 1.

8. Activate monitoring for the four tracks.

If you now start playback, the audio from computer 2 will be sent “live” to the new tracks on computer 1, allowing you to hear them together with any tracks you play back on computer 1.

For more information about Monitoring, see [“About monitoring”](#) on [page 13](#).

Adding more tracks

OK, but if you have more audio tracks than you have VST System Link busses (physical outputs)? Then you just use the computer 2 mixer as a submixer: Route several audio channels to the same output bus and adjust the output bus level if needed.

Note also that if your audio cards have multiple sets of input and output connections you can link up e.g. multiple ADAT cables and send audio via any of the busses on any of the cables.

Internal mixing and latency

One problem with mixing inside the computer is the latency issue we mentioned earlier. The VST engine always compensates for record latencies, but if you are monitoring through computer 1 you will hear a processing delay while you listen to signals coming from your other computers (not on your recording!). If your audio card in computer 1 supports ASIO Direct Monitoring you should definitely turn this on – you'll find the setting in the VST Audio System Device Setup panel (see [“ASIO Direct Monitoring”](#) on [page 49](#)). Most modern ASIO cards support this function. If yours doesn't you may want to change the Offset value in the VST System Link Setup panel to compensate for any latency issues.

Setting up a larger network

This is not much more difficult than a two computer network. The main thing to remember is that VST System Link is a daisy chain system. In other words, the output of computer 1 goes to the input of computer 2, the output of computer 2 goes to the input of computer 3, and so on around the chain. The output of the last computer in the chain must always go back into the input of computer 1, to complete the ring.

Once you've done this, the transmission of all the transport, sync, and MIDI information to the whole network is handled pretty much automatically. However, where you may run into confusion in a large network is in the transmission of audio signals back to a central mix computer.

If you have lots of hardware inputs and outputs on your ASIO cards you don't need to send audio via the chain at all, but can transmit it directly to the master mix computer via one or more of its other hardware inputs. For example, if you have a Nuendo Digiset interface or 9652 card on computer 1 you could use ADAT cable 1 for networking, ADAT cable 2 as a direct audio input from computer 2, and ADAT cable 3 as a direct audio input from computer 3.

You can also transmit audio via the ring system if you don't have enough hardware I/Os for direct audio transmission. For example, in a four computer scenario you could send audio from computer 2 into a channel in the mixer in computer 3, and from there to a channel in the mixer in computer 4, and from there back to the master mixer in computer 1. This can certainly be tricky to set up, so generally it is recommended that if you want to set up a complex network, you should make sure to use ASIO cards with at least three separate digital I/Os.

Application examples

Using one computer for VST instruments

In this example, one computer will be used as main record and playback machine, and another computer as a virtual synth rack.

1. Record a MIDI track into computer 1.
2. Once you have finished recording, route the MIDI output of that track to System Link MIDI port 1.
3. Now go to computer 2, open up the VST Instrument rack and assign an instrument to the first slot in the rack.
4. Route the VST Instrument channel to the desired output bus.

If you are using computer 1 as your main mixing computer, this would be one of the VST System Link output busses, connected to computer 1.

5. Create a new MIDI track in the Project window of computer 2, and assign the MIDI output of the track to the VST Instrument you created.

6. Assign the MIDI input of the track to be VST System Link port 1.

Now, the MIDI track on computer 1 is routed to the MIDI track on computer 2, which in turn is routed to the VST Instrument.

7. Now activate monitoring for the MIDI track on computer 2, so that it will listen and respond to any MIDI commands coming in.

In Cubase AI, click the monitor button in the Track list or Inspector.

8. Press play on computer 1.

It will now send the MIDI information on the track to the VST Instrument loaded on computer 2.

Even with a slow computer you should be able to stack a whole bunch of extra VST Instruments this way, expanding your sound palette considerably. Don't forget that VST System Link MIDI is also sample-accurate, and thus has much tighter timing than any hardware MIDI interface ever invented!

Creating a virtual effect rack

The effect sends for an audio channel in Cubase AI can either be routed to an FX channel track or to any activated Group or output bus. This allows you to use a separate computer as a "virtual effect rack", by setting things up in the following way:

1. Go to computer 2 (the machine you will use as effect rack) and add a new stereo audio track.
You cannot use an FX channel track in this case, since the track must have an audio input.
2. Add the desired effect as an insert effect for the track.
Let's say you add a high-quality reverb plug-in.
3. In the Inspector, select one of the VST System Link busses as input for the audio track.
You want to use a separate System Link bus, which will only be used for this purpose.
4. Route the channel to the desired output bus.
If you are using computer 1 as your main mixing computer, this would be one of the VST System Link output busses, connected to computer 1.
5. Activate monitoring for the track.
6. Now, go back to computer 1 and select a track to which you want to add some reverb.
7. Bring up the effect sends for the track in the Inspector.

8. Pull down the send routing pop-up menu for one of the sends, and select the VST System Link bus assigned to the reverb in step 3.

9. Use the send slider to adjust the amount of effect as usual.

The signal will be sent to the track on computer 2 and processed through its insert effect, without using any processor power on computer 1.

You can repeat the steps above to add more effects to the “virtual effect rack”. The number of effects available this way is only limited by the number of ports used in the VST System Link connection (and of course by the performance of computer 2, but given that it won’t have to handle any recording or playback, you should be able to use quite a lot of effects).

Getting extra audio tracks

All computers on a VST System Link network are locked with sample-accuracy. Therefore, if you find that the hard drive on one computer isn’t fast enough to run as many audio tracks as you need, you can record new tracks on one of the other computers instead. This would create a “virtual RAID system”, with several disks all operating together. All tracks will remain locked together just as tightly as if they were all running on the same machine. This means that you effectively have an unlimited track count! Need another 100 tracks? Just add another computer.

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Video

Background

Cubase AI plays back video films in a number of formats.

Under Windows, video playback can be done using one of three playback engines: Video for Windows, DirectShow or Quicktime. This ensures compatibility with as wide a range of video files as possible. The following file formats are supported: AVI, Quicktime and MPEG.

Under Mac OS X, Quicktime is always used as playback engine. QuickTime supports the following video file formats: AVI, MPEG, QuickTime and DV.

There are two ways to play back video:

- Without any special hardware.

While this will be fine in many situations it does put a limit on the size of the video window as well as the quality of the image.

- Using video hardware that, for example, connects to an external monitor.

Mac OS X: Using a FireWire port, you can play back video on an external monitor using a DV-to-analog converter or a DV camera.

You can play back DV video. QuickTime is used for playback.

Windows: Multi-head graphics cards that support overlay functionality can be used to display the video picture on an external monitor. The following manufacturers have working (and tested) solutions available:

nVIDIA and Matrox.

Before you start

When working on a project involving a video file, there are several points to bear in mind:

Have you selected the right player? (Windows only)

The player is used not only for playback of the video file, but also to provide file information in the Pool and in the Import Video dialog. Therefore, to make sure that you have chosen the right player for a particular type of video file, check the file information displayed in the Import Video dialog or the Pool prior to trying to import or playing back the file.

When this information reads “0x0 pixel”, “0.000 s” and “0 Frames”, the video file is either corrupt, or the format is not supported by the codecs available to the selected video player. You will either have to change the video player, or install the required codec.

⚠ Trying to import or play back a file not supported by the selected video player leads to unpredictable results – if no information on the number of frames, the length and the pixel resolution is available in the Import Video dialog or the Pool, you cannot import/play this file properly with this particular video player.

⚠ You can change the video player in the Device Setup dialog. After having done so, make sure to remove any previously imported video file from the Pool first, and re-import it.

Editing a video file

Video clips are played back by events just as audio clips are. You can use all the basic editing operations on video events, just as with audio events. The following operations are not possible on the video track:

- Drawing, Gluing, and Scrubbing.

Note that when you activate the Mute button for a video track, the video playback will be stopped, but playback of any other Project events will continue. See below.

- The video track has no editor and does not make use of parts.

- Cubase AI allows you to cut, copy, paste and trim video events, i.e. your video track may contain more than one video event. However, when using the DirectShow video player (Windows only), you may find that only the first event on the video track is played back correctly. In such a case make sure that the video track contains no more than one video event.

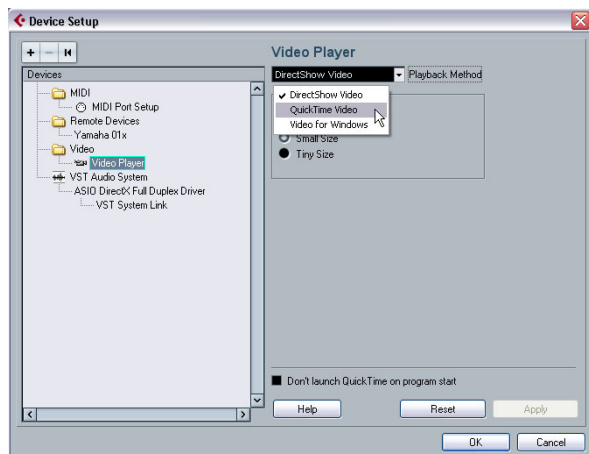
- Under Windows, you may find that you are unable to edit a video file copied from a CD. This is because files copied from CD are write protected by default. Right-click the file and deactivate the “Read-Only” option in the File Properties dialog.

- When you have a video file in a format not supported by Cubase AI, use an external application to convert the file to a format that Cubase AI can import.

Operations

About the video playback engine

In Cubase AI for Windows, you select a playback engine in the Device Setup–Video Player page:



- Make sure to read the section [“Before you start”](#) on [page 233](#).

- Generally, you can expect most Windows hardware to work with DirectShow.

On a Windows system, the DirectShow and Video for Windows players are provided by the operating system, so you don't have to install any additional software.

- Under Windows, QuickTime must be installed on your computer for Quicktime playback to be available. There is a freeware version (a QuickTime installer is included on the Cubase AI DVD if required, or you can download it from www.quicktime.com) and a “pro” version, which offers additional video cutting options. The player engine is the same in both versions, so for mere playback in Cubase AI there is no need to purchase the “pro” version.
- Under Mac OS X, only the Quicktime playback engine is available, supporting the formats AVI, MPEG, QuickTime and DV. If your system has a FireWire port, there is also a FireWire option – see below.

Importing a video file

Video files are imported in the same manner as audio files.

- By using the File menu (Import–Video File).

- By using drag and drop from the Windows Explorer/ Mac OS Finder or the Pool.

This requires that a video track has been added to the Project and that you drop the video file onto this track.

- By importing the file to the Pool first and then dragging it into the Project window (see the chapter [“The Pool”](#) on [page 128](#) for details).

Note:

- You can only have one video track in each project. The Video track is added like other tracks in the Project window by using the Add Track submenu on the Project menu. If a project does not contain a video track when you import a video file via File–Import–Video file, this is added automatically.
- All video files on the track must be of the same size and compression format.

Video import preferences

In the Preferences dialog (Editing–Video page), there is an option that affects the import of video files:

- Generate Thumbnail Cache on Import Video File

When this is activated, a thumbnail cache file will be created automatically when you import a video file. This is handy, as a cache file will also be created when you import a video file using drag and drop.

Advantage of thumbnail cache files

⇒ To display video thumbnails in the Project window, the option “Show Video Thumbnails” has to be activated in the Preferences dialog (Event Display–Video page).

When working with video in Cubase AI, video files are displayed as events/clips on the video track with thumbnails representing the frames in the film. These are calculated in real time, i.e. they have to be redrawn during scrolling or moving. As this consumes quite a lot of processor power, reaction sometimes may be sluggish. To remedy this, you can generate a thumbnail cache file.

The cache file is used in situations where the processor load is very high and the correct redrawing or real-time calculation might use system resources necessary for editing or processing. When the cache file is used and you zoom in on the thumbnails, you will see that they are in a

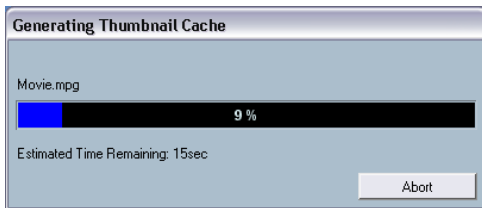
lower resolution, i.e. the pictures are not as clean as when they are calculated. When the processes that rely heavily on the computer CPU are finished, the frames will be automatically recalculated, i.e. the program automatically switches between real-time calculation of the pictures and using the cache file.

The generated thumbnail cache file will be stored in the same folder as the video file and will get the name of the file with the suffix “.videocache”.

Generating thumbnail cache files during video import

A thumbnail cache file will be created automatically before the file is inserted in the Project window, if you activated “Generate Thumbnail Cache on Import Video File” in the Preferences (Editing–Video page).

A window will be displayed, showing you the progress and the estimated time for the process.



The thumbnail cache file is created.

After the cache file is created, the window will be closed and the video clip is inserted as usual. When you now start video playback and perform processor consuming operations, the thumbnail file is used to display the video frames in the Project window. When enough processor power is available, the “real” calculated thumbnail frames are displayed again.

Generating thumbnail cache files from within the Pool

When you have video files without thumbnail cache files (e.g. if you did not create a thumbnail cache file during import or if you are working with an older project), you always have the possibility to generate the thumbnail cache file at a later stage. This is done from within the Pool.

Proceed as follows:

1. Open the Pool window and locate the video file you want to create a thumbnail cache for.
2. Right-click on the file to open the context menu and select “Generate Thumbnail Cache”, or select “Generate Thumbnail Cache” from the Media menu.

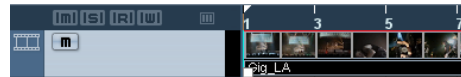
Just as when creating the file during import, the status window opens (see above).

After the file is created, the window will be closed and the thumbnail cache file is used when necessary, i.e. under high load.

⚠ Please note that the cache file will not be automatically updated if a video file is edited. Whenever you change a video file (e.g. in a video editing application), you need to create a new thumbnail cache file manually, as described above. (To refresh the “real” thumbnails of an edited video file, resize the video track so that they are calculated again.)

Playing back a video file

Video files are displayed as events/clips on the video track, with thumbnails representing the frames in the film (if the option Show Video Thumbnails is activated in the Preferences, Event Display–Video page).



A video event on a video track.

In the track list and Inspector, you will find the control “Mute Video”. When this is activated, video playback will be stopped, but playback of any other events in the project will continue (to decrease the processor load).

To view the video on the computer screen (as opposed to on an external monitor, see below), proceed as follows:

- If you’re running Mac OS X, open the Device Setup dialog from the Devices menu, click “Video Player” in the list and make sure “Onscreen Window” is selected in the Video Output section of the dialog.
- Under Windows, either pull down the Devices menu and select Video, or use a key command – by default [F8], or double-click the video clip.

A video window appears. In Stop mode, this displays the video frame at the project cursor position.

The video will be played back together with any other events in the Project window as usual.

Setting the Window size

If you are playing back video in a window on your computer screen, you may want to adjust the size.

On a Mac, this is done by dragging the borders, just like resizing other windows.

Under Windows, proceed as follows:

- Open the Device Setup dialog from the Devices menu, click Video Player in the Devices list and use the buttons in the Video Properties section to select a size.

Playing back video in full screen mode

When viewing video on the computer screen, you can choose to let the video occupy the whole screen during playback or in Stop mode:

- Right-click in the video window to switch to full screen. Click again to exit full screen.

Playing back video file using graphics cards (Windows only)

Multi-head graphics cards that support overlay functionality can be used to display the video picture on an external TV or computer monitor in full screen mode. The manufacturers nVIDIA and Matrox have working (and tested) solutions available. Check the card's documentation for information on how it handles video output and how to set it up for multi-monitor display.

Playing back a video via FireWire (Mac OS X only)

For Apple computers equipped with a FireWire port, you can easily connect external video hardware via this, as OS X has built-in video support for the most common formats (NTSC/PAL/DVCPRO). FireWire is capable of high data-transfer speed and is the most common standard for communicating with video-related peripheral equipment.

- To play back a video file via hardware connected to the FireWire port, select "FireWire" in the Outputs pop-up of the Device Setup–Video Player dialog. When FireWire is selected as output, a number of format options appear on the Format pop-up, allowing you to select between various video formats and resolutions.

Video playback preferences

In the Preferences (Event Display–Video page), there are two options for video playback:

- **Show Video Thumbnails.**

When this is activated, thumbnail frames of the video contents are shown in the track.

- **Video Cache Size.**

This determines how much memory is available for video thumbnails. If you have long video clips and/or work with a large zoom factor (so that a lot of frames are shown in the thumbnails), you may have to raise this value.

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File handling

Working with Projects

New Project

The New Project command on the File menu allows you to create a new project, either empty or based on a template:

1. Select New Project from the File menu.

A list of templates is displayed. When you install Cubase AI, templates for various purposes are included, but you can also create your own (see “Save as Template” on page 239).

2. Select a template from the list or select “Empty”.

A file dialog opens, allowing you to specify a folder for the new project.

3. Select an existing project folder or click on Create and enter a name for a new one in the dialog that opens.

A new, untitled project is created.

Open

The Open command on the File menu is used for opening saved project files.

1. Select Open... from the File menu.

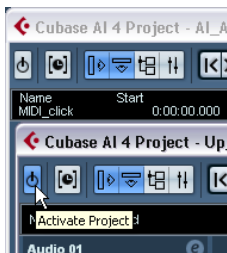
A file dialog opens, allowing you to select a project.

2. Click Open.

The project opens in the Project window.

- Several projects can be open at the same time.

The active project is indicated by the blue Activate button in the upper left corner of the Project window. To make another project active, click its Activate button.



An active project.

- You can also open project files by selecting an entry from the “Recent Projects” submenu on the File menu. This submenu lists the projects you have recently worked with, with the most recent one at the top of the list.
- Projects can also automatically be opened when you launch Cubase AI (see “Startup Options” on page 240).

About the “Pending Connections” dialogs

If you open a Cubase AI project created on another setup (other audio hardware), the program tries to find matching audio inputs and outputs for the i/o busses (this is one of the reasons why you should use descriptive, generic names for your input and output ports – see “Preparations” on page 10).

If the program cannot resolve all audio/MIDI inputs and outputs used in the project, a Pending Connections dialog will open. This will allow you to manually re-route any ports specified in the project to ports available in your system.

Close

The Close command on the File menu closes the active window. If a Project window is active, selecting Close will close the corresponding project.

- If the project contains unsaved changes, you will be asked whether you want to save the project before closing it.

If you select “Don't Save” and have recorded or created new audio files since saving, you get the choice to delete or keep these.

Save and Save As

The commands Save and Save As allow you to save the active project as a project file (file extension “.cpr”). The Save command stores the project under its current name and location, while Save As allows you to rename and/or relocate the file. In case you haven't yet saved the project or it hasn't been changed since it was last saved, only Save As will be available.

- ⚠ Generally, we recommend that you save project files in their project folders, to keep the projects as manageable as possible.

A word about file extensions

Under Windows, file types are indicated by three letter file name extensions (such as *.cpr for Cubase AI project files).

Under Mac OS X, it is not necessary to use file name extensions, since the file types are stored internally in the files. However, if you want your Cubase AI projects to be compatible with both platforms, you should make sure the

option “Use File Extension in File Dialog” is activated in the Preferences (General page). When this is activated (default), the proper file name extension is automatically added when you save a file.

Save New Version

This function is only available as a key command, by default [Ctrl]+[Alt]+[S] (Windows) or [Command]+[Option]+[S] (Mac). When you use this function, a new version of the project is saved under a new file name.

The new file will have the same name as the original project, but with an incremental number attached. For example, if your project is called “My Project”, you will get new versions called “My Project-01”, “My Project-02”, and so on.

Save New Version is useful if you are experimenting with edits and arrangements and want to be able to go back to a previous version at any time. The newest versions are always listed on the Recent Projects submenu on the File menu for instant access.

Save as Template

This function allows you to save the current project as a template. When you create a new project, the available templates will be listed, allowing you to base the new project on a template.

Proceed as follows:

1. Set up a project.
 2. Select “Save As Template...” from the File menu and save the project template with a name of your choice.
- Templates can contain clips and events just like regular projects.

If this is not what you want, make sure to remove all clips from the Pool before you save the project as template.

Templates are always stored in the Templates folder.

On a Windows system, it is located at \Documents and Settings\<username>\Application data\Steinberg\Cubase AI 4\templates. On a Mac system, it is located inside Users/<username>/Library/Preferences/Cubase AI 4.

Setting up a default template

If you always want the same default project to open when you launch Cubase AI, you can save a default template. Proceed as follows:

1. Set up a project.
2. Select “Save As Template...” from the File menu and save the project template with the name “default”.
3. Open the Preferences dialog and select the General page.
4. Open the “On Startup” pop-up and select the option “Open ‘Default’ Template”.

The next time you launch Cubase AI, the default template is automatically opened. For details on the other Startup options, see “Startup Options” on [page 240](#).

Save Project to New Folder

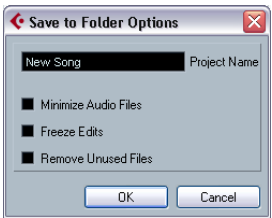
This function is very useful if you want to move or archive your project.

1. Select “Save Project to New Folder”.

A file dialog opens in which you can choose an existing, empty folder or create a new folder to save the project.

2. Click OK to confirm your choice.

The “Save to Folder Options” dialog opens with the following options:



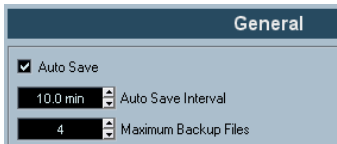
Option	Description
Project Name	Enter a project name if you want to change it from the default (the current name of the project).
Minimize Audio Files	If this is activated, only the audio file portions that are actually used in the project will be included. This can significantly reduce the size of the project folder (if you are using small sections of large files), but it also means you cannot use other portions of the audio files if you continue working with the project in its new folder.
Freeze Edits	This will perform a Freeze Edits operation, making all processing and applied effects permanent to each clip in the Pool, see “Freeze Edits” on page 104 .
Remove Unused Files	When this is activated, only files in the Pool that are actually used in the project will be stored in the new folder.

- 3. Make the desired settings.
- 4. Click OK.

The project is saved in the new folder. The original project is not affected. However, now you could e.g. delete the original project without losing your project data.

Startup Options

Auto Save



If you activate the Auto Save checkbox in the Preferences (General page), Cubase AI will automatically save backup copies of all open projects with unsaved changes.

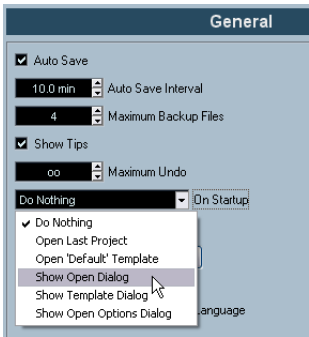
Backup copies of projects are named “<project name>-xx.bak”, where xx is an incremental number. Unsaved projects are backed up in a similar way as “UntitledX-xx.bak”, with X being the incremental number for unsaved projects. All backup files are saved in the project folder.

- Use the “Auto Save Interval option” to set the time intervals in which a backup copy will be created.
- Use the “Maximum Backup Files” option to specify how many backup files will be created with the Auto Save function.

When the maximum number of backup files is reached, the existing files will be overwritten (starting with the oldest file).

On Startup

The “On Startup” pop-up menu in the Preferences (General page) allows you to specify what should happen each time you launch Cubase AI.



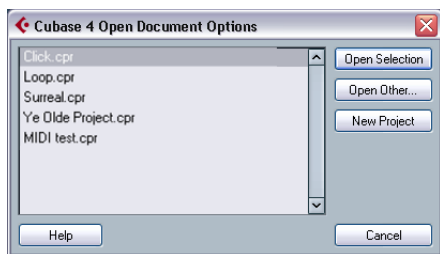
The following options are available:

Option	Description
Do Nothing	Cubase AI launches without opening a project.
Open Last Project	The last saved project is opened on launch.
Open 'Default' Template	The default template is opened, see “Setting up a default template” on page 239 .
Show Open Dialog	The Open dialog opens on launch, allowing you to manually locate and open the desired project.
Show Template Dialog	The Template dialog opens on launch, allowing you to create a new project from one of the templates.
Show Open Options Dialog	The Open Document Options dialog opens on launch, see below. It allows you to make a different choice each time you launch Cubase AI.

Cubase AI Open Document Options Dialog

This dialog will open in two cases:

- If you launch Cubase AI with the option “Show Open Options Dialog” selected on the “On Startup” pop-up menu in the Preferences (General page).
- If you hold down [Ctrl]/[Command] while launching Cubase AI.



The Open Document Options Dialog.

The dialog lists your recently used projects.

- To open a project, select it and click the “Open Selection” button.
- To open another project not listed here, click the “Open Other...” button.
A file dialog opens that allows you to look for the desired file on your disk.
- To create a new project, click the “New Project” button.

Revert

If you select “Revert” from the File menu, you will be asked whether you really want to revert to the last saved version of the project. If you click “Revert”, all changes you have made since saving will be discarded.

If you have recorded or created new audio files since saving, you will be asked whether you want to delete or keep these.

Importing audio

⇒ For exporting Audio, see the chapter “[Export Audio Mixdown](#)” on [page 211](#)”.

Importing audio files

For information on audio file import preferences, please see “[Audio file import options](#)” on [page 26](#). For information on import into the Pool and import options, see “[Import Medium...](#)” on [page 136](#).

Importing ReCycle files

ReCycle by Propellerhead Software is a program designed especially for working with sampled loops. By “slicing” a loop and making separate samples of each beat, ReCycle makes it possible to match the tempo of a loop and edit the loop as if it was built of individual sounds. Cubase AI can import two file types created by ReCycle:

- REX files (export file format of the first versions of ReCycle, extension “.rex”).
- REX 2 files (file format of ReCycle 2.0 and later, extension “.rx2”).

Proceed as follows:

1. Select an audio track and move the project cursor to where you want the imported file to start.
You probably want to import REX files to tempo based audio tracks, since this will allow you to change the tempo later on (having the imported REX file automatically adjust).
2. Select “Audio File...” from the Import submenu on the File menu.
3. Select REX files or REX 2 files with the file type pop-up menu in the file dialog.
4. Locate and select the file and click Open.
The file is imported and automatically adjusted to the current Cubase AI tempo.

Unlike a regular audio file, the imported REX file will consist of several events, one for each “slice” in the loop. The events will automatically be placed in an audio part on the selected track and positioned so that the original internal timing of the loop is preserved.

5. If you now open the part in the Audio Part Editor, you can edit each slice separately by muting, moving and re-sizing events, adding effects and processing, etc.
You can also adjust the tempo and have the REX file automatically follow (provided that its track is tempo based).

⇒ You can achieve similar results by using Cubase AI’s own loop slicing features, see “[Working with hitpoints and slices](#)” on [page 121](#).

Importing compressed audio files

Cubase AI can import several common audio compression formats. The procedure is the same as when importing any non-compressed audio file, with one important thing to note:

- When you import a compressed audio file, Cubase AI will create a copy of the file and convert this to Wave format (Windows) or AIFF format (Mac OS X) before importing it. The original compressed file will not be used in the project.

The imported file will be placed in the designated project Audio folder.

⚠ The resulting Wave/AIFF file will be several times larger than the original compressed file.

The following file types are supported:

MPEG audio files

MPEG, which stands for Moving Picture Experts Group, is the name of a family of standards used for coding audio-visual information (e.g. movies, video, music) in a digital compressed format.

Cubase AI can read two types of audio MPEG files: MPEG Layer 2 (*.mp2) and MPEG Layer 3 (*.mp3). Currently, mp3 is the most common of these formats, while the mp2 format is mostly used in broadcast applications.

Windows Media Audio files (Windows only)

Windows Media Audio is an audio format developed by Microsoft Inc. Due to advanced audio compression algorithms, Windows Media Audio files can be made very small, maintaining good audio quality. The files have the extension “.wma”.

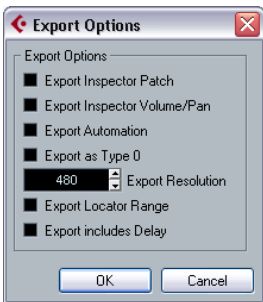
Exporting and importing MIDI files

Cubase AI can import and export Standard MIDI Files, which makes it possible to transfer MIDI material to and from virtually any MIDI application on any platform. When you import and export MIDI files, you can also specify whether certain settings associated with the tracks should be included in the files (automation tracks, volume and pan settings etc.).

Exporting MIDI files

To export your MIDI tracks as a Standard MIDI File, pull down the File menu and select “MIDI File...” from the Export submenu. A regular file dialog opens, allowing you to specify a location and name for the file.

When you have specified a location and a name for the file, click “Save”. The Export Options dialog opens, allowing you to specify a number of options for the file – what should be included in the file, its type and its resolution (see below for descriptions of the options).



The Export Options dialog.

You will also find these settings in the Preferences (MIDI–MIDI File page). If you set these up once and for all in the Preferences, you only need to click OK in the Export Options dialog to proceed.

The dialog contains the following options:

Option	Description
Export Inspector Patch	If this is activated, the MIDI patch settings in the Inspector – Bank Select and Program Select (used for selecting sounds in the connected MIDI instrument) are included as MIDI Bank Select and Program Change events in the MIDI file.
Export Inspector Volume/Pan	If this is activated, Volume and Pan settings made in the Inspector are included as MIDI Volume and Pan events in the MIDI file.

Option	Description
Export Automation	If this is activated, recorded automation (see “Background” on page 90) is converted to MIDI controller events and included in the MIDI file.
Export as Type 0	If this is activated, the MIDI file will be of Type 0 (all data on a single track, but on different MIDI channels). If you don't activate this option, the MIDI file will be of Type 1 (data on separate tracks). Which type to choose depends on what you want to do with the MIDI file (in which application or sequencer it should be used, etc.).
Export Resolution	You can specify a MIDI resolution between 24 – 960 for the MIDI file. The resolution is the number of pulses, or ticks, per quarter note (PPQ) and determines the precision with which you will be able to view and edit the MIDI data. The higher the resolution, the higher the precision. The resolution should be chosen depending on the application or sequencer with which the MIDI file should be used though, since certain applications and sequencers may not be able to handle certain resolutions.
Export Locator Range	If this is activated, only the range between the locators will be exported.
Export includes Delay	If this is activated, the delay of the MIDI track will be included in the MIDI file.

- ⇒ The MIDI file will include the Tempo track.
- ⇒ Inspector settings other than those specified in the Export options are not included in the MIDI file!

Importing MIDI files

To import a MIDI file from disk, proceed as follows:

1. Select “MIDI File...” from the Import submenu on the File menu.
2. If there is already an open project, a dialog opens in which you can select whether a new project should be created for the file or not.
If you select “No”, the MIDI file will be imported into the current project.
3. Locate and select the MIDI file in the file dialog that opens and click Open.
 - If you choose to create a new project, select the project folder.
Select an existing project folder or create a new by clicking on Create and entering a name in the dialog.

The MIDI file is imported. The result depends on the contents of the MIDI file and the Import Options settings in the Preferences (MIDI–MIDI File page). The Import Options are as follows:

Option	Description
Extract First Patch	If this is activated, the first Program Change and Bank Select events for each track are converted to Inspector settings for the track.
Extract First Volume/Pan	If this is activated, the first MIDI Volume and Pan events for each track are converted to Inspector settings for the track.
Import Controller as Automation Tracks	If this is activated, MIDI controller events in the MIDI file will be converted to automation data for the MIDI tracks.
Import to Left Locator	If this is activated, the imported MIDI file will be placed so that it starts at the position of the left locator – otherwise it will start at the beginning of the project. Note that if you choose to have a new project created automatically, the MIDI file will always start at the beginning of the project.
Import dropped File as single Part	If this is activated and you drag and drop a MIDI file into the project, the whole file will be placed on a single track.
Ignore Master-track Events on Merge	If this is activated and you import a MIDI file into the current project, tempo track data in the MIDI file is ignored. The imported MIDI file will play according to the current Tempo track in the project.

As mentioned in [“Exporting MIDI files”](#) on [page 242](#), the result also depends on what type of MIDI file it is – Type 0 or Type 1:

- If the MIDI file is of Type 0 (all data on a single track), only one MIDI track will be created.
This track will be set to MIDI Channel “Any”, allowing all MIDI events to play back on their original channels. You can use the Dissolve Part function on the MIDI menu to distribute the events onto different tracks with different MIDI Channels (see [“Dissolving parts into separate channels”](#) on [page 160](#)).
- If the MIDI file is of Type 1 (data on several tracks), a number of new MIDI tracks and parts will be created.

In both cases, the Tempo track is adjusted according to the Tempo track in the MIDI file.

⚠ It is also possible to import a MIDI file from disk by dragging and dropping it from the Windows Explorer or the Mac OS Finder into the Cubase AI Project window. The Import Options apply as well.

27

Customizing

Background

The user can customize the appearance and functionality of Cubase AI in various ways.

User configurable items described in this chapter are:

- Setup dialogs

Several parts of the user interface (toolbars, Transport panel, Inspector, info lines and channel settings windows) provide a Setup dialog, where the user can configure which items of the respective window area or panel are to be shown or hidden and where they should be located.

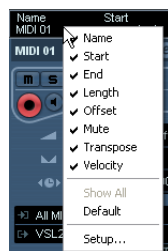
- Appearance

The general look of the program can be adjusted – see “[Appearance](#)” on [page 246](#).

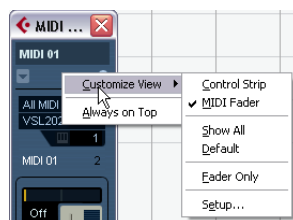
- Track and event colors

You can adjust which colors should be used – see [“Applying track and event colors”](#) on [page 246](#).

This chapter also contains a section describing where your preferences and settings are stored (see [“Where are the settings stored?”](#) on [page 249](#)), to help you transfer your customized settings to another computer.



The info line and Inspector setup context menus. In the Inspector setup context menu, the available options depend on the track type.



The channel settings setup context menu for a MIDI track. The available options depend on the track type.

The Setup dialogs

The following elements in the program feature Setup dialogs and context menus:

- the Transport panel
- the info lines
- the Channel Settings windows
- the toolbars
- the Inspector

Customizing via the setup context menus

If you right-click the Transport panel, the toolbars, the info lines, or the Inspector, the respective setup context menu opens. For channel settings windows, these options are found in the Customize View submenu on the context menu. On this menu, you can activate or deactivate elements as desired.

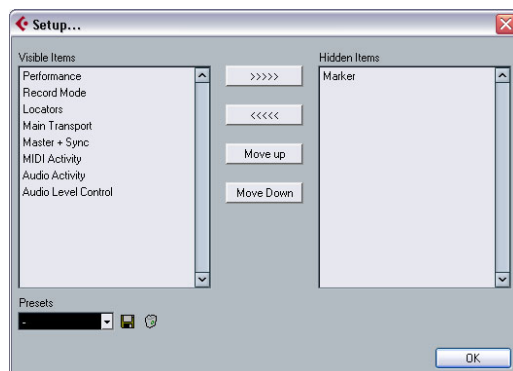
The following general options are available in the setup context menus:

- “Show All” makes all items visible.
- “Default” resets the interface to the default setting.
- “Setup...” opens the Setup dialog (see below).

Customizing via the Setup dialog

If you select “Setup...” from the setup context menus, the Setup dialog opens. Here you can:

- choose which elements (“items”) should be visible or hidden for the Transport panel, the toolbars or the Inspector.
- configure where the items should be placed.
- save and recall presets, i.e. different configurations.



The Setup dialog, e.g. for the Transport panel.

The dialog is divided into two columns. The left column displays the currently visible items and the right column displays the currently hidden items.

- You can change the current show/hide status by selecting items in one column and then using the arrow buttons in the middle of the dialog to move them to the opposite column.
Changes are applied directly.

- By selecting items in the “Visible Items” column and using the Move Up and Move Down buttons, you can change the position of the selected item(s).
Changes are applied directly. To undo all changes and revert back to the standard layout, you can select “Default” from the setup context menu.



A “customized” Transport panel.

- If you click the Save button (disk icon) in the Presets section, a text field opens, allowing you to name the current configuration and to save it as a preset.
The saved setting will be displayed in the Presets field.
- To remove a preset, select it and click the trash icon.
- Saved configurations are available for selection from the Presets pop-up in the Setup dialog or directly from the setup context menu.

Appearance

In the Preferences dialog you will find a page called Appearance. The following settings are available:

- **Basic Appearance Scheme.**

By selecting an option from this pop-up menu you can adjust the general look of the program. After selecting an Appearance Scheme and clicking Apply or OK, you need to restart the program for the changes to take effect.

- **Brightness/Intensity sliders.**

These sliders allow you to fine-tune the brightness and contrast in various areas in the program. Changes take effect when you click Apply or OK.

Applying track and event colors

You can use color scheming for easier overview of tracks and events in the event display of the Project window. Applying colors is divided into two areas; track and event colors.

- A track color is shown and can be edited in the Inspector, the Track list, and the corresponding channel in the Mixer. It is furthermore displayed in all parts and events for the track in the event display.
Track colors can be switched on and off globally.
- Event colors are shown for parts and events in the event display and are independent from the track colors.

⇒ An applied event color “overrides” the track color, if both are used.

The palette of the color bar can be customized, see [“The Event Colors dialog” on page 248](#).

Track colors

Applying track colors manually

To activate track colors, proceed as follows:

1. Click the Show/Hide Track Colors button at the top of the Track list.



This brings up the track color selector in the Inspector, the Track list and in the Mixer.

2. To bring up the color palette, click the track color selector.



Click the arrow in the track name title bar or...



...click the color strip in the Track list.



In the Mixer, click the track color selector below the channel name.

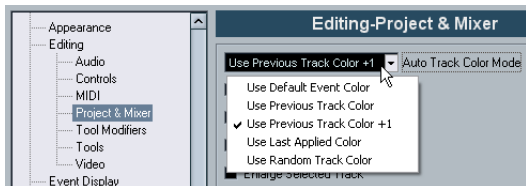
3. Select a color from the color bar.

The chosen track color is now reflected in the Inspector title bar and the color strip as well as in the Mixer and any parts or events on the selected track.



Applying track colors automatically

In the Preferences (Editing–Project & Mixer page) you can find the option “Auto Track Color Mode”.



This offers you several options for automatically assigning colors to tracks that are added to the project.

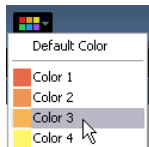
Option	Effect
Use Default Event Color	The default color (gray) is assigned.
Use Previous Track Color	Uses the color of the track above the new one (i.e. the track that is selected when you add a new track).
Use Previous Track Color +1	Uses the color next to the color of the track above the new one (+1 refers to the color number in the palette).
Use Last Applied Color	The last manually assigned color is used.
Use Random Track Color	Track colors are assigned randomly.

Coloring parts and events

There are two ways to color parts and events in the Project window:

Using the color selector

1. Select parts or events.
2. Choose a color from the color selector in the toolbar.



Using the color tool

1. Select the color tool (the paint bucket icon).



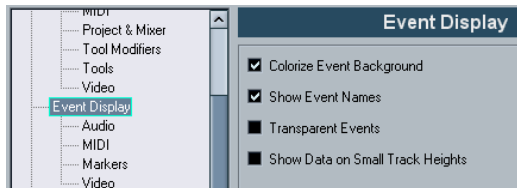
2. Click the small strip below it to bring up the color palette.
3. Choose a color.
4. Click on a part/event to assign the color.

The color is applied to all selected parts/events and overrides the track color (if used).

- If you press [Ctrl]/[Command] and click on a part/event with the color tool, the color palette is displayed and you can choose the desired color for an event.
- If you press [Alt]/[Option], the color tool cursor becomes a pipette, which can be used to select a color by clicking on a part/event.

Customizing the event background

On the Event Display page in the Preferences, you can find the option “Colorize Event Background”.



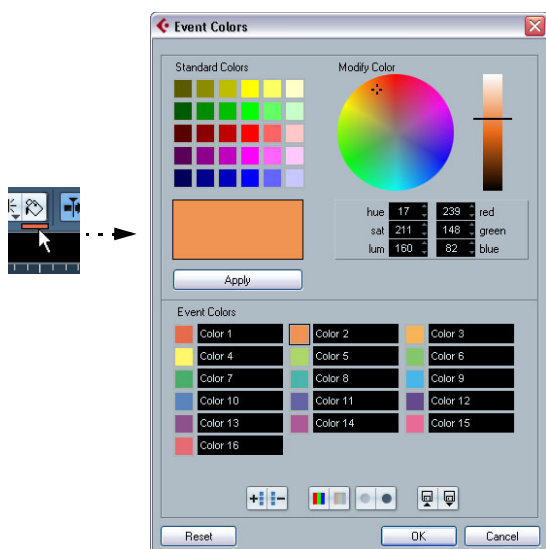
This option affects the display of events in the project window.

- When this is activated, the background of the events and parts in the event display will be shown in the selected color.
- When this is deactivated, the event “content”, i.e. MIDI events, audio waveforms, etc. will be displayed in the selected color and the event background will be displayed in gray.

The Event Colors dialog

You can open the Event Colors dialog in two ways:

- Double-click the small strip below the color tool.



To add new colors to the color palette, proceed as follows:

1. Click the Insert New Color button in the Event Colors section to add a new color.

A new color icon and color name are added to the Event Colors section.

2. Click the color field next to the name field to activate the new color for editing.

3. In the Standard Colors section, choose a standard color. You can modify the selected color by:

- Moving to another point in the color circle.
- Moving the handle in the color meter.
- Manually entering the values for red, green and blue and hue, saturation and luminosity.

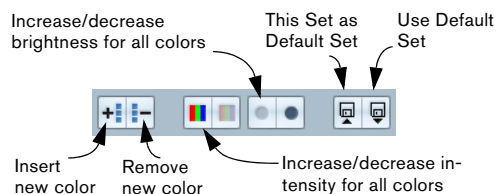
4. Click the Apply button in the Standard Colors section. The color setting is applied to the selected color item.

You can edit every existing event color accordingly.

- To delete an event color item, select it and click the Remove Selected Color button in the Event Colors section.
- To increase or decrease the intensity and the brightness of all colors, use the corresponding buttons in the Event Colors section.
- To save the current set as default, click the button “This set as default set” in the Event Colors section. Accordingly, click the button “Use default set” to the right to apply the saved default set.
- To return to the standard setting of the palette in Cubase AI, click Reset.

- Open the Color pop-up menu on the toolbar and select “Select Colors...”.

In the Event Colors dialog, you can fully customize the color palette, apart from the default color (gray).



Where are the settings stored?

As you have seen, there are a large number of ways in which you can customize Cubase AI. While some of the settings you make are stored in each project, others are stored in separate preference files.

If you need to transfer your projects to another computer (e.g. in another studio), you can bring all your settings along by copying the desired preference files and installing them on the other computer.

⇒ It's a good idea to make a backup copy of your preference files once you have set things up the way you want! This way, if another Cubase AI user wants to use his or her personal settings when working on your computer, you can restore your own preferences afterwards.

- Under Windows, preference files are stored in the folder “\Documents and Settings\<user name>\Application Data\Steinberg\Cubase AI AI 4\”.

On the Start menu, you will find a shortcut to this folder for easy access.

- Under Mac OS X, preference files are stored in the folder “Library/Preferences/Cubase AI AI 4/” under your home directory.

The full path would be: “/Users/<user name>/Library/Preferences/Cubase AI AI 4/”.

⇒ RAMpresets.xml is saved when exiting the program.

⇒ Program functions or configurations not used in the project will not be stored.

The table below shows the location and name of each preference file:

Setting	Stored in
Current edit modifier keys	Edit Modifiers.xml
Current key commands	Key Commands.xml
Current preferences	Defaults.xml
Color setup	saved in the project
Default Color setup	Defaults.xml
Crossfade presets	\Presets\RAMPresets.xml
Drum maps	\DrumMaps as *.drm file
Installed MIDI devices	Midi Devices.bin

Setting	Stored in
Key commands presets	\Presets\KeyCommands\<Preset Name>.xml
Logical Editor presets	\Presets\Logical Edit\<Preset Name>.xml
Mixer (or channel) settings	saved in the last active folder as *.vmx file (VST Mixer settings)
Mixer view preset	saved in project
Patch name scripts	\Scripts\Patchnames\ as *.txt file
Port Input/ Output settings	Port Setup.xml
Quantize presets	\Presets\RAMPresets.xml
Toolbar presets	\Presets\RAMPresets.xml
Transport panel presets	\Presets\RAMPresets.xml
Usage profile log	Usage Profile.xml (only saved if the corresponding option in the Preferences is activated)
User templates	Under Programs\Steinberg\Cubase AI 4\templates\<Template Name>.cpr
VST connections presets	\Presets\RAMPresets.xml
VST 3 plug-ins and instruments	VstPlugInfo.xml
VST 2 plug-ins and instruments	Vst2xPlugins.xml
Not loadable VST2 plug-ins	Vst2xBlacklist.xml
VST3 presets (included in the program)	In the application folder under \VST3 Presets\<company>\<plug-in name> as *.vstpreset file
VST3 presets (user-defined, for all programs)	Win: \Common files\VST3 Presets\<company>\<plug-in name> Mac: Users/<user name>/Library/Audio/Presets/<company>/<plug-in name> as *.vstpreset file
VST3 presets (public, for all programs)	Win: \Documents and Settings\VST3 Pre-sets\<company>\<plug-in name> Mac: (Network)/Library/Audio/Presets/<company>/<plug-in name> as *.vstpreset file
Zoom presets	\Presets\RAMPresets.xml

Background

Introduction

Most of the main menus in Cubase AI have key command shortcuts for certain items on the menus. In addition, there are numerous other Cubase AI functions that can be performed via key commands. These are all default settings. If you want, you can customize existing key commands to your liking, and also add commands for menu items and functions currently not assigned any.

⚠ You can also assign tool modifier keys, i.e. keys that change the behavior of various tools when pressed. This is done in the Preferences dialog – see [“Setting up tool modifier keys”](#) on [page 254](#).

How are key commands settings saved?

Every time you edit or add any key command assignment, this is stored as a global Cubase AI preference – not as part of a project. Hence, if you edit or add a key command assignment, any subsequent projects that you create or open will use these modified settings. However, the default settings can be restored at any time by selecting “Reset All” in the Key Commands dialog.

In addition, you can save key commands settings as a “key commands file”, which is stored separately and can be imported into any project. This way you can quickly and easily recall customized settings, when moving projects between different computers, for example. The settings are saved in a file on disk with the windows extension “.xml”.

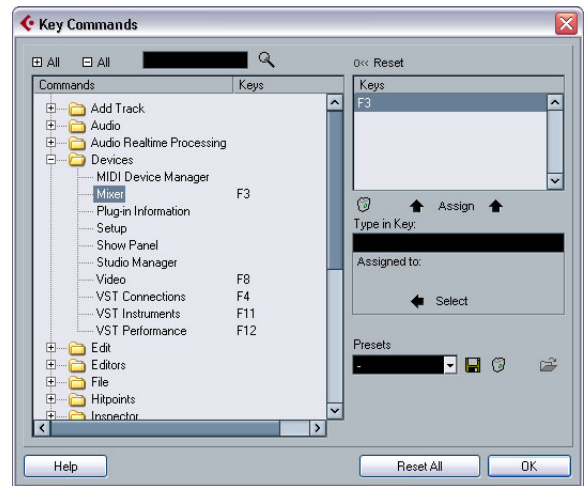
How to save key commands settings is described in the section [“About key commands presets”](#) on [page 253](#).

Setting up key commands

The following is a description of how you set up key commands and save them as presets for easy access.

Key commands settings are accessed and edited mainly in the Key Commands dialog. You can find some key command settings in the Preferences dialog as well, also addressed in this chapter.

Adding or modifying a key command



In the Key Commands dialog you will find all main menu items and a large number of other functions, arranged in a hierarchical way similar to that of the Windows Explorer and Mac OS Finder. The function categories are represented by a number of folders, each containing various menu items and functions. When you open a category folder by clicking the plus-sign beside it, the items and functions it contains are displayed with the currently assigned key commands.

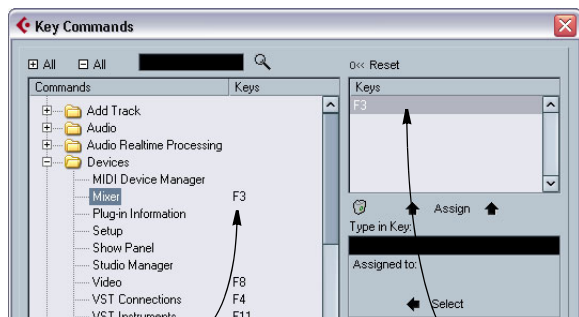
To add a key command, proceed as follows:

1. Pull down the File menu and select “Key Commands...”. The Key Commands dialog appears.
2. Use the list in the Commands column to navigate to the desired category.
3. Click the plus-sign to open the category folder and display the items it contains.

Note that you can also click the “global” plus and minus-signs in the top left corner to open and close all category folders at once.

4. In the list, select the item to which you wish to assign a key command.

Already assigned key commands are shown in the Keys column as well as in the Keys section in the top right corner.



If a selected item or function has a key command assigned already, it is displayed here... ..and here.

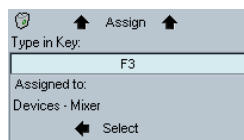
5. Alternatively, you can use the search function in the dialog to find the desired item.

For a description of how to use the search function, see [“Searching for key commands”](#) on page 252.

6. When you have found and selected the desired item, click in the “Type in Key” field and enter a new key command.

You can choose between any single key or a combination of one or several keys ([Command], [Option] (Mac), [Ctrl], [Alt] (Win), [Shift]) plus any key. Just press the keys you want to use.

7. If the key command you entered is already assigned to another item or function, this is displayed below the “Type in Key” field.



In case a key command already is assigned to another function, you can either ignore this and proceed to assign the key command to the new function instead, or you can select another key command.

8. Click the Assign button above the field.

The new key command appears in the Keys list.

- ⚠ If the key command you enter is already assigned to another function, you will get a prompt asking if you want to reassign the command to the new function instead, or cancel the operation.

Note that you can have several different key commands for the same function. So adding a key command to a function that already has another key command will not replace the key command previously defined for the function. If you wish to remove an assigned key command, please see [“Removing a key command”](#) on page 252.

9. Click OK to exit the dialog.

Searching for key commands

If you want to know which key command is assigned to a certain function in the program, you can use the Search function in the Key Commands dialog:

1. Click in the search text field at the top left of the dialog and type in the function for which you want to know the key command.

This is a standard word search function, so you should type the command as it is spelled in the program. Partial words are OK; e.g., to search for all quantize related commands, you could type “Quantize”, “Quant”, etc.

2. Click the Search button (the magnifying glass icon).

The search is conducted and the first matching command is selected and displayed in the commands list below. The keys column and the keys list show the assigned key commands, if any.

3. To search for more commands containing the word(s) you entered, just press the Search button again.

4. When you’re done, click OK to close the dialog.

Removing a key command

To remove a key command, proceed as follows:

1. If the key commands dialog isn’t already open, pull down the File menu and select “Key Commands...”.

2. Use the list of categories and commands to select the item or function for which you wish to remove a key command.

The key command for the item is shown in the Keys list and the Keys column.

3. Select the key command in the Keys list and click the Remove button (the trash icon).

You will get a prompt asking if you want to remove the key command or cancel the operation.

4. Click OK to close the dialog.

About key commands presets

Saving key commands presets

As mentioned above, any changes made to the key commands are automatically stored as a Cubase AI preference. However, it is also possible to store key commands settings separately. This way, you can store any number of different key command settings as presets for instant recall.

Proceed as follows:

1. Set up the key commands to your liking.

When setting up key commands, remember to click “Assign” to make the changes.

2. Click the Save button next to the Presets pop-up menu.

A dialog appears, allowing you to type in a name for the preset.



3. Click OK to save the preset.

Your saved key commands settings will now be available in the Preset pop-up menu for your future projects.

Loading key command presets

To load a key command preset, simply select it from the Presets pop-up menu.

⇒ Note that this operation may replace existing key commands!

The key command settings you load will replace the current key command settings for the same functions (if any).

If you want to be able to revert to your current settings again, make sure to save them first, as described above!

Loading saved key commands settings from Cubase SX 1

If you have saved key commands settings with version 1 of Cubase, it is possible to use them in Cubase AI, by using the “Import Key Command File” function, which lets you load and apply saved key commands:

1. Open the Key Commands dialog.
2. Click the “Import Key Command File” button to the right of the Presets pop-up menu.
A standard file dialog opens.



3. In the file dialog, use the “Files of type:” pop-up to specify if you want to import a key commands file (Windows file extension “.key”).

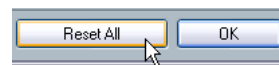
With version 2 of Cubase, key commands files with the Windows extension “.xml”. So after you have imported an older file, you might want to save it as a preset (see [“About key commands presets”](#) on [page 253](#)) to be able to access it from the Presets pop-up menu in the future.

4. Navigate to the file you want to import and click “Open”.
The file is imported.

5. Click OK to exit the Key Commands dialog and apply the imported settings.

The settings in the loaded key commands file now replace the current settings.

About the “Reset” and “Reset All” functions



These two buttons in the Key Commands dialog will both restore the default settings. The following rules apply:

- “Reset” restores the default key command setting for the function selected in the Commands list.
- “Reset All” will restore the default key commands for all commands.

⚠ Note that the “Reset All” operation will cause any changes made to the default key commands to be lost! If you want to be able to revert to these settings again, make sure to save them first!

About the default key commands

As mentioned before, there are numerous default key commands. These are listed in the section [“The default key commands”](#) on [page 254](#).

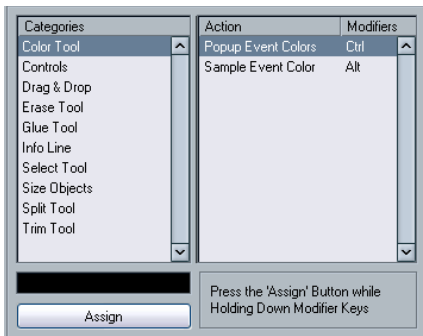
Setting up tool modifier keys

A tool modifier key is a key you can press to get an alternate function when using a tool. For example, clicking and dragging an event with the Arrow tool normally moves it – holding down a modifier key (by default [Alt]/[Option]) will copy it instead.

The default assignments for tool modifier keys can be found in the Preferences (Editing–Tool Modifiers page).

Here, you can also edit them:

1. Open the Preferences dialog from the File menu (on the Mac, this is located on the Cubase AI menu) and select the Editing–Tool Modifiers page.



2. Select an option in the Categories list, and then locate the action for which you want to edit the modifier key. For example, the “Copy” action mentioned above resides in the category “Drag & Drop”.

3. Select the action in the Action list.

4. Hold down the desired modifier key(s) and click the Assign button.

The current modifier key(s) for the action is replaced. If the modifier key(s) you pressed are already assigned to another tool, you will be asked whether you want to overwrite them. If you do, this will leave the other tool without any modifier key(s) assigned.

5. When you’re done, click OK to apply the changes and close the dialog.

The default key commands

Below, the default key commands are listed according to category.

- As described in the section “[Key command conventions](#)” on [page 8](#), modifier keys are written as: [Win modifier key]/[Mac modifier key]. For example, “[Ctrl]/[Command]+[N]” in the list below means “press [Ctrl] under Windows or [Command] under Mac OS X, then press [N]”.

Audio category

Option	Key command
Adjust Fades to Range	[A]
Crossfade	[X]
Find Selected in Pool	[Ctrl]/[Command]+[F]

Devices category

Option	Key command
Mixer	[F3]
Video	[F8]
VST Connections	[F4]
VST Instruments	[F11]
VST Performance	[F12]

Edit category

Option	Key command
Autoscroll	[F]
Copy	[Ctrl]/[Command]+[C]
Cut	[Ctrl]/[Command]+[X]
Cut Time	[Ctrl]/[Command]+[Shift]+[X]
Delete	[Del] or [Backspace]
Delete Time	[Shift]+[Backspace]
Duplicate	[Ctrl]/[Command]+[D]
Insert Silence	[Ctrl]/[Command]+[Shift]+[E]
Left Selection Side to Cursor	[E]
Move to Cursor	[Ctrl]/[Command]+[L]
Mute	[M]
Mute Events	[Shift]+[M]
Mute/Unmute Objects	[Alt]/[Option]+[M]
Open Default Editor	[Ctrl]/[Command]+[E]

Option	Key command
Open List Editor	[Ctrl]/[Command]+[G]
Open Score Editor	[Ctrl]/[Command]+[R]
Open/Close Editor	[Return]
Paste	[Ctrl]/[Command]+[V]
Paste at Origin	[Alt]/[Option]+[V]
Paste Time	[Ctrl]/[Command]+[Shift]+[V]
Record Enable	[R]
Redo	[Ctrl]/[Command]+[Shift]+[Z]
Repeat	[Ctrl]/[Command]+[K]
Right Selection Side to Cursor	[D]
Select All	[Ctrl]/[Command]+[A]
Select None	[Ctrl]/[Command]+[Shift]+[A]
Snap On/Off	[J]
Solo	[S]
Split At Cursor	[Alt]/[Option]+[X]
Split Range	[Shift]+[X]
Undo	[Ctrl]/[Command]+[Z]
Unmute Events	[Shift]+[U]

Editors category

Option	Key command
Show/Hide Infoview	[Ctrl]/[Command]+[I]
Show/Hide Inspector	[Alt]/[Option]+[I]

File category

Option	Key command
Close	[Ctrl]/[Command]+[W]
New	[Ctrl]/[Command]+[N]
Open	[Ctrl]/[Command]+[O]
Quit	[Ctrl]/[Command]+[Q]
Save	[Ctrl]/[Command]+[S]
Save As	[Ctrl]/[Command]+[Shift]+[S]
Save New Version	[Ctrl]/[Command]+[Alt]/[Option]+[S]

MIDI category

Option	Key command
Quantize	[Q]

Navigate category

Option	Key command
Add Down: Expand/Undo selection in the Project window to the bottom/ Move selected event in the Key Editor down 1 octave	[Shift]+[Down Arrow]
Add Left: Expand/Undo selection in the Project window/Key Editor to the left	[Shift]+[Left Arrow]
Add Right: Expand/Undo selection in the Project window/Key Editor to the right	[Shift]+[Right Arrow]
Add Up: Expand/Undo selection in the Project window to the top/ Move selected event in the Key Editor up one octave	[Shift]+[Up Arrow]
Bottom Select bottom track in the track list	[End]
Down: Select next in the Project window/ Move selected event in the Key Editor one semitone down	[Down Arrow]
Left: Select next in the Project window/ Key Editor	[Left Arrow]
Right: Select next in the Project window/ Key Editor	[Right Arrow]
Top: Select top track in the track list	[Home]
Up: Select next in the Project window/ Move selected event in the Key Editor one semitone up	[Up Arrow]

Nudge category

Option	Key command
End Left	[Alt]/[Option]+[Shift]+[Left Arrow]
End Right	[Alt]/[Option]+[Shift]+[Right Arrow]
Left	[Ctrl]/[Command]+[Left Arrow]
Right	[Ctrl]/[Command]+[Right Arrow]
Start Left	[Alt]/[Option]+[Left Arrow]
Start Right	[Alt]/[Option]+[Right Arrow]

Project category

Option	Key command
Open Markers	[Ctrl]/[Command]+[M]
Open Tempo Track	[Ctrl]/[Command]+[T]
Open/Close Pool	[Ctrl]/[Command]+[P]
Setup	[Shift]+[S]
Show/Hide Track Colors	[Shift]+[C]

Tool category

Option	Key command
Delete tool	[5]
Draw tool	[8]
Drumstick tool	[0]
Glue tool	[4]
Mute tool	[7]
Next Tool	[F10]
Play tool	[9]
Previous Tool	[F9]
Range tool	[2]
Select tool	[1]
Split tool	[3]
Zoom tool	[6]

Transport category

Option	Key command
AutoPunch In	[I]
AutoPunch Out	[O]
Cycle	Pad [/]
Exchange time formats	[.]
Fast Forward	[Shift]+Pad [+]
Fast Rewind	[Shift]+Pad [-]
Forward	Pad [+]
Input Left Locator	[Shift]+[L]
Input Position	[Shift]+[P]
Input Right Locator	[Shift]+[R]
Input Tempo	[Shift]+[T]
Insert Marker	[Insert] (Win)
Locate Next Event	[N]
Locate Next Marker	[Shift]+[N]

Option	Key command
Locate Previous Event	[B]
Locate Previous Marker	[Shift]+[B]
Locate Selection	[L]
Locators to Selection	[P]
Loop Selection	[Shift]+[G]
Metronome On	[C]
Nudge Down	[Ctrl]/[Command]+Pad [-]
Nudge Up	[Ctrl]/[Command]+Pad [+]
Panel (Transport panel)	[F2]
Play Selection Range	[Alt]/[Option]+[Space]
Recall Cycle Marker 1 to 9	[Shift]+Pad [1] to Pad [9]
Record	Pad [*]
Retrospective Record	[Shift]+Pad [*]
Return to Zero	Pad [,] or Pad [.,]
Rewind	Pad [-]
Set Left Locator	[Ctrl]/[Command]+Pad [1]
Set Marker 1	[Ctrl]/[Command]+[1]
Set Marker 2	[Ctrl]/[Command]+[2]
Set Marker 3 to 9	[Ctrl]/[Command]+Pad [3] to [9] or [Ctrl]/[Command]+ [3] to [9]
Set Right Locator	[Ctrl]/[Command]+Pad [2]
Start	[Enter]
Start/Stop	[Space]
Stop	Pad [0]
Sync Online	[T]
To Left Locator	Pad [1]
To Marker 1	[Shift]+[1]
To Marker 2	[Shift]+[2]
To Marker 3 to 9	Pad [3] to [9] or [Shift]+[3] to [9]
To Right Locator	Pad [2]

Zoom category

Option	Key command
Zoom Full	[Shift]+[F]
Zoom In	[H]
Zoom In Tracks	[Alt]/[Option]+[Down Arrow]
Zoom Out	[G]
Zoom Out Tracks	[Alt]/[Option]+[Up Arrow] or [Ctrl]/[Command]+[Up Arrow]
Zoom to Event	[Shift]+[E]
Zoom to Selection	[Alt]/[Option]+[S]
Zoom Tracks Exclusive	[Z] or [Ctrl]/[Command]+ [Down Arrow]

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